Understanding pre-school children's Community Dental Service appointment failure: a mixed-methods study

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Abstract

Background

Disengagement is the active avoidance of a group or situation. Patient disengagement is an ongoing problem for health services and governments, as it reduces efficiency, generates additional financial costs, and reduces early identification and management of health problems. Patients who frequently disengage from preventive care services often require secondary care.

Patient disengagement is an ongoing issue for oral health services. Cost, past experience, perceptions, and accessibility are key determinants to oral health service disengagement. Moreover, child disengagement is likely to follow into adolescence and adulthood. However, oral health disengagement is under researched, and what research has been conducted, predominately utilises quantitative methods. These methods identify disengagement characteristics, including who, when and how often, but fails to uncover why patients disengage from oral health services. In contrast, qualitative research methods usefully augment the current evidence-base by providing rich insights into disengagement rationalisation.

Disengagement is often the result of a combination of complex circumstances occurring in a patient's life. These complexities make disengagement difficult to clearly define. However, appointment failure is considered as one important component of disengagement, and for the purpose of this research, was used as a proxy measure of disengagement.

The study investigates appointment failure at the Canterbury District Health Board's (CDHB) Community Dental Service (CDS). The CDS is a preventative dental service

providing free dental care for eligible children between the age of 6 months to 13 years, in Canterbury and South Canterbury.

Objectives

Set with the Canterbury District Health Board's (CDHB) Community Dental Service (CDS), the primary research objectives are to identify the characteristics of pre-schooler appointment failure, identify the frequency of appointment failure per Community Dental Clinic (CDC), and discover parent and caregiver reasons for disengagement and their recommendations to the CDS to ameliorate it.

Methods

The study was granted ethics approval from the CDHB research office and the University of Canterbury (UC), Human Ethics Committee.

A mixed methods sequential research design was employed to meet the research objectives. Phase one, a quantitative epidemiological investigation, utilised a retrospective closed cohort of eligible CDHB CDS pre-schoolers born in 2010 and their 2010-2014 appointment history. Eligibility required pre-schoolers to be enrolled with the CDS for the duration of the study period. A descriptive and analytical epidemiological approach was taken to characterise the population and factors associated with appointment failure.

Phase two, the qualitative component, involved undertaking two parent and caregiver focus groups. Focus group participants were recruited from CDS clinic locations identified as having high failure rates in Phase one. To be eligible for the focus group, parents and caregivers had to have at least one pre-schooler currently enrolled in the CDS, who had missed a minimum of two appointments. Focus group

transcripts were transcribed and analysed to uncover the factors that influence appointment failure.

Results

Overall, in Phase one, 6,986 pre-schoolers were born in 2010 and eligible for CDS enrolment. Male pre-schoolers accounted for 50.4% of the study population, while females made up 49.6%. The majority of pre-schoolers were European (77.6%), followed by Māori, Asian, Pacific Islands and Other, 9.2%, 7.7%, 3.9% and 1.6% respectively. Of the total number of pre-schoolers, 49.8% were living in the least deprived areas (quintiles one and two), 19.3% were living in moderate deprivation areas (quintile three) and 30.9% were living in the most deprived areas (quintiles four and five).

Of the 18,933 scheduled appointments, 12.3% ended in appointment failure. The odds of failing an appointment were significantly greater for pre-schoolers with a Māori or Pacific Islands ethnicity (4.3 and 4.8 respectively), living in high deprivation areas (3.0 and 5.6 respectively), or aged 3 or 4 years at their scheduled appointment (0.6 and 0.5 respectively). Appointment type and pre-schooler sex did not increase the odds of failing an appointment.

In Phase two, focus group participants identified four factors that influence appointment failure: waiting room and dental surgery ambience, staff attitude, physical resources that inhibit accessibility, and communicating with technology. Participants did not associate their childhood and current dental anxiety and fear with their pre-schooler's failed appointments. Participants made several recommendations to reduce future appointment failure; these recommendations ranged in implementation difficulty. Seemingly simple recommendations involved

enhancing the clinic environment, issuing parents with fridge magnets with the services contact details, and clinical staff communication. Potentially more difficult recommendations involved changing the clinic hours to offer late night and weekend appointments, and changing the services care delivery model so pre-schoolers can be screened in CDS mobile dental vans instead of CDC's.

Conclusions

Consistent with New Zealand oral health literature, Māori and Pacific Islands pre-schoolers, pre-schoolers living in high deprivation areas and pre-schoolers aged 3 or 4 experienced greater odds of failing an appointment at the CDS. However, unique to New Zealand oral health disengagement literature, four factors were identified by participants as influencing their pre-schoolers appointment failure. These factors did not include a participant's own childhood dental perceptions and experiences as influencing their pre-schoolers failed appointments; a factor considered to be a barrier in the international literature.

The strengths of the research were the selected research methods and analysis. The mixed methods approach brought an innovative complementary perspective to an important but poorly understood topic. The opportunity to use a large, prospectively collected database systematically captured from a reliable patient data information system to inform strengths based focus groups, was also important. Talking to parents and caregivers and uncovering the reasons for non-attendance provided fresh insight, outside the routinely collected quantitative variables, and is another salient strength of this study.

The research findings demonstrate the complexity and intricacies of pre-school appointment failure. Furthermore, there are clear cultural, socio-economic and age

disparities associated with CDS disengagement. The CDS needs to address these disparities by targeting and promoting a service that will best meet the needs of vulnerable parents and caregivers. To improve utilisation for vulnerable pre-schoolers, the CDS should begin by incorporating the recommendations made by participants into the services model of care and future service development.

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Table of Contents

List of Tables

List of Figures

List of Abbreviations

AIC:	Akaike Information Criterion
CIHI:	Canadian Institute of Health Information
CDHB:	Canterbury District Health Board
CDB:	Central Business District
CDC:	Community Dental Clinic
CDS:	Community Dental Service
CI:	Confidence interval
DGA:	Dental General Anaesthetics
DNA:	Did Not Attend
DHB:	District Health Board
GA:	General Anaesthetic
GAD:	Generalised Anxiety Disorder
GCI:	Global Caries Initiative
GIS:	Geographic Information Systems
HIA:	Health Impact Assessment
HDS:	Hospital Dental Service
MoH:	Ministry of Health
MSD:	Ministry of Social Development
NHI:	National Health Index
NHS:	National Health Service

NZDep:	New Zealand Deprivation Index
OR:	Odds ratio
Patkey:	Patient Identification Number
PIMS:	Patient Information Management System
StatsNZ:	Statistics New Zealand
UC:	University of Canterbury
UCHEC:	University of Canterbury Human Ethics Committee
UK:	United Kingdom
US:	United States

Chapter 1: Introduction

Patient disengagement is an ongoing issue for many services in New Zealand and internationally, and is the focus of the current research. However, it is important to establish a clear understanding of what is meant by disengagement.

1.1 Defining disengagement

Disengagement has been defined as “the action or process of withdrawing from involvement in an activity, situation, or group” (Oxford University Press, 2015). However, this definition may be further refined into two types of disengagement, sporadic disengagement and frequent disengagement. Sporadic disengagement is when an individual rarely or intermittently commits disengagement behaviour, whereas frequent disengagement is when an individual repeatedly commits disengagement behaviour (Oxford University Press, 2016b, 2016f). Different definitions exist and services need to be mindful of other disengagement terminology, which may include rebooking or rescheduling appointments. A person who frequently rebooks or reschedules an appointment, displays similar, if not the same behaviour to a person who frequently disengages.

Within the literature, disengagement is commonly characterised and measured as a quantitative outcome. While such quantified data enables identification of who, when, where and how often, the use of qualitative research can uncover why disengagement occurs, and therefore augment the depth of analysis. However, to date, scant work appears in the literature of ‘why’.

A comprehensive understanding of the cause of disengagement behaviour is difficult because of the complex relationships between a person’s social, economic, cultural, political circumstances, and the health service (Donaldson et al., 2008; Duijster,

Verrips, & van Loveren, 2013; Fisher-Owens et al., 2007; Kuh, Ben-Shlomo, Lynch, Hallqvist, & Power, 2003; Newton & Bower, 2005). It is these complex relationships which make the cause of disengagement more difficult to understand. The complexity behind the causation is unlikely to be elucidated by quantitative methods, and more often than not, this is the reason why appointment failure is often used as a proxy for disengagement.

Consistent with much quantitative research into disengagement, this proxy of appointment failure was adopted in Phase one (quantitative phase) of this research, but the terms appointment failure and disengagement are used interchangeably in Phase two (qualitative phase).

The CDS defines appointment failure as “a patient who does not turn up or gives no advance warning within 15 minutes” (S. Julian, personal communication, January 20, 2015). This definition applies to any appointment type. The definition is recorded on arrival and does not further elaborate on disengagement that may occur in the dental surgery, for example, non-compliance in the dental chair. This definition is unique to the CDS and has been adopted for this research. Other DHB’s in New Zealand use a variation of this definition.

1.2 Health disengagement

In health, patient disengagement with preventative health care services reduces the services ability to identify, monitor and manage health problems in a safe and timely manner (Ludeke et al., 2012; Wang & Aspelund, 2009; Whyman, Mahoney, Stanley, & Morrison, 2012). Patients who frequently do this often experience poor health and require secondary care (Ludeke et al., 2012; Whyman et al., 2012).

Patient disengagement has been an ongoing struggle for health services and governments in developing and developed countries. For example, in the United States, the Pittsburgh Post-Gazette reported that no-shows cost the “U.S. health-care system more than $150 billion a year” (Toland, 2013). In the United Kingdom, the National Health Service (NHS) have estimated the financial cost of missed appointments at “£360 million per year” (Mitchell & Selmes, 2007, p. 423). Other consequences associated with patient disengagement can be unproductive staff, negative staff attitudes towards patients who disengage, ineffective use of resources and displacement of other patients waiting for an appointment (Mbada et al., 2013; Moore, Wilson-Witherspoon, & Probst, 2001).

Patients with complex needs are more likely to experience disengagement (Donaldson et al., 2008; Listl, 2012; Partrick et al., 2006). Identified demographics and familial risk factors include, poor health literacy and time management, transience, language barriers, low socioeconomic status and belonging to an ethnic minority (Canvin, Jones, Marttila, Burstrom, & Whitehead, 2007; Donaldson et al., 2008; Jacobs, Shepard, Suaya, & Stone, 2004; Listl, 2012).

Services that understand why disengagement occurs are in a better position to understand at risk populations, know where to invest resources and how to adapt their service delivery models (Moursi, 2003).

1.3 Oral health disengagement

Disengagement within dental services is a persistent problem that is under researched (Newton & Bower, 2005). Despite the introduction of modern dental equipment and improved pain relief over the last fifty years, patient disengagement rates remain unacceptably high and inequalities persist in developing and developed

countries (Listl, 2012; Ministry of Health, 2010; Partrick et al., 2006; Watt & Sheiham, 1999).

A review of the oral health literature identifies service perception, anxiety and fear, social relationships and means of accessibility, as four highly influential factors for disengagement behaviour (Canvin et al., 2007; Moore, Brodsgaar, & Rosenberg, 2004; Partrick et al., 2006).

Engagement with dental services is important because the majority of dental diseases are preventable (Ministry of Health, 2010). Engagement ensures dental diseases can be identified, monitored and managed before they deteriorate (Ministry of Health, 2010; New Zealand Dental Association, 2008).

Individuals who frequently disengage are more likely to experience acute or chronic pain and have trouble eating, speaking and sleeping (New Zealand Dental Association, 2008). Indirect consequences may be school or work absenteeism (New Zealand Dental Association, 2008). Frequent child disengagement is often prioritised by health services and governments because there is an abundance of research highlighting the impact undesirable health behaviours at a young age has on health behaviour later in life (Bukatko, 2008; Fisher-Owens et al., 2007; Gray, 2007; Listl, 2012). As a preventative method, many countries offer free or subsidised dental care, particularly for children (Department of Health, 2016; Jaafar, Noh, Muttalib, Othman, & Healy, 2013; Ministry of Health, 2015b).

Other means to reduce child disengagement has been through the introduction of dental nurses (Nash, 2009; Partrick et al., 2006). The purpose of the dental nurse was to bridge the gap between home and primary care by forming a rapport with children and families, and reduce the patient load from dentists (Nash, 2009; Partrick

et al., 2006). As the role of the dental nurse became more disposable, their clinical scope broadened and their title of dental nurse was rebranded to dental therapist (District Health Boards New Zealand, 2006). However, both titles continue to be used interchangeably amongst people outside the dental sector.

While these changes have seen an increased measure of appointment attendance for a number of children, it has not led to a significant drop in patient disengagement for vulnerable children (Chrisopoulos & Harford, 2012; Ministry of Health, 2010). Children that are most vulnerable are typically of an ethnic minority, live in high deprivation areas, are transient, and more likely to access secondary care (Ministry of Health, 2010; Whyman et al., 2012)

A report on behalf of the Canadian Institute of Health Information (CIHI), on young children and general anaesthetics between 2010 and 2012, found there were approximately “19,000 day surgeries to treat early childhood caries in children under the age of six” (Adams, 2014, p. 1). This is consistent with Australian statistics regarding the use of dental general anaesthetics (DGA). The statistics show a “3-fold increase in child DGA from 1993-1994”, with the report going on to explain how 0-4 year olds have the highest DGA rates (Jamieson & Roberts-Thomson, 2006, p. 2). A review of New Zealand’s secondary care system between 1990 and 2009 found that “children aged between 3 and 8 years have had the greatest rates of increase in hospital admission [for dental related conditions]” (Whyman et al., 2012, p. 14).

In Canterbury, the CDHB identified greater utilisation rates of general anaesthetic for Māori children and Pacific Islands children requiring hospital dental care. Between 2006 and 2008, Māori children under 10 years of age “were more likely to have a general anaesthetic for management of dental problems” (Reid, 2010, p. 1). Similar

findings were found with Pacific Islands children, who had poorer oral health compared to other ethnic groups and were more likely to access secondary care (MacDonald, 2013).

1.4 New Zealand oral health

In New Zealand, oral health disengagement inequalities have been persistent for decades (Ministry of Health, 2000, 2010). New Zealanders more susceptible to disengagement are predominately from low socio-economic groups, transient, belong to an ethnic minority and experience language barriers (Ministry of Health, 2000, 2010).

The Ministry of Health (MoH) 2011/2012 New Zealand Health Survey found demographically, “poorer health and poorer access to primary health care among Māori and Pacific children, and children living in more deprived areas” (Ministry of Health, 2012a, p. vii). The 2009 Oral Health Survey also highlighted this and found dental utilisation was “lowest for pre-school children aged 2-4 years [at] 59.7%” (Ministry of Health, 2010, p. xviii). The survey also identified ethnic disparities: “Māori children were more likely to have experienced unmet need for an oral health care worker in the past year” (Ministry of Health, 2010, p. 17). Similar results were found for Pacific Islands children with the authors stating, they are “not accessing dental services as regularly as other children” (Ministry of Health, 2010, p. 20). Gaps were also found to be widening amongst Asian children who “were less likely to have seen an oral health care worker in the previous year than children in the total population” (Ministry of Health, 2010, p. 22).

Acknowledging these demographics and influences, New Zealand has tried hard to be proactive when addressing oral health patient disengagement inequalities. Action

began as early as World War 2 when the barrier of dentistry costs were removed for school aged children (Schmidt, 2012). This continued, and in 1947, the then Labour Government extended the removal of dental costs to "all New Zealand children up to the age of 16 [years]" (Museum of New Zealand Te Papa Tongarewa, n.d.). Eventually, free dental care was made available to eligible children and adolescents from birth until their 18th birthday (Ministry of Health, 2015b).

Despite the proactive stance, disengagement inequalities remained, and in early 2000, the MoH decided to re-orientate the publicly funded Child and Adolescent School Dental Service (Ministry of Health, 2000, 2010). The reorientation meant the New Zealand child and adolescent dental service would introduce modern equipment, computerised patient management systems, up-skilled staff, with more focus on prevention rather than the previous "drill and fill" approach (Ministry of Health, 2010). Under the reorientation, each DHB had the opportunity to select and present a service model they felt reflected their population's needs to the MoH. Overall, the reorientation was successful and increased the national utilisation rate for children accessing publicly funded dental services. However, inequalities remained for vulnerable children (Ministry of Health, 2011).

1.5 Canterbury District Health Board (CDHB) Community Dental Service (CDS)

The CDHB's CDS provides free dental care to eligible Canterbury and South Canterbury pre-school, primary and intermediate school aged children. Children eligible for the service must be a New Zealand citizen or permanent resident, or have a parent who holds a two year work visa or permit.

After the decision was made to re-orientate and modernise public dental services in New Zealand, the CDHB introduced a 'Hub and Spoke' model. In this case, a 'hub'

represents a fixed CDC and ‘spokes’ comprised the mobile service units that provide care as an extension of the hub (Govindarajan & Ramamurti, 2013). In total, 14 new clinics were positioned at primary and intermediate schools across Canterbury and South Canterbury. These clinics were supported by 21 mobile dental vans that circulate most primary and intermediate schools in Canterbury and South Canterbury, with 4 mobile clinics circulating the rural population. Prior to this model’s implementation, all parents and caregivers were required to bring their children to dental clinics located at certain schools for examination and treatment.

The purpose of the new model is to increase patient engagement, reduce inequalities, and improve the region’s oral health by having a fixed and mobile dental service providing high quality preventative care. Under the new service model, pre-school children require a parent or guardian present at examination and treatment appointments. Primary and intermediate school aged children only require a parent or guardian present during a treatment appointment. Any child new to the service must have a parent or caregiver present at their first appointment (Foote, Hepi, & Nicholas, 2014).

Overall, the new model of care has increased patient engagement for children in Canterbury and South Canterbury (Ministry of Health, 2011). However, like other DHBs, the CDS still struggles to engage with some families. Young children, especially those who are Māori or Pacific Islands, transient or live in high deprivation areas, are considered a priority for the CDS. While the service has protocols to follow up with these families, their life circumstances often make it difficult to manage ongoing engagement.

A further mitigating issue for the Canterbury region has been the devastating, unprecedented sequence of earthquakes, which began in 2010. Christchurch city experienced significant damage to tens of thousands of homes, as well as damage to commercial buildings and the central business district (CBD). There was a substantial shift in population distribution, with many families moving to the greater Christchurch area or other parts of the country (Canterbury Earthquake Recovery Authority, 2014; Morgan et al., 2015).

Disruption to CDS operations was also experienced, with some clinics temporarily closing, and increased transience influencing appointment attendance during this time. Operational disruptions coupled with considerable temporary and permanent population movement made it difficult to quantify the number of families leaving the Canterbury and South Canterbury region. Therefore, the impact the earthquake activity has had on appointment failure during the study period is not a primary aim for this research.

This research is the first to be undertaken in Canterbury and appears to be the first of its kind in New Zealand. This research aims to improve patient engagement with the CDS by quantitatively and qualitatively providing the most current and comprehensive empirical research, whilst using a strengths based approach to create discussions with current service users. The discussion will ask current service users about the reasons behind their appointment failure, as well as their recommendations for service improvement to support reengagement. Research findings will be presented to the DHB, as well as being made available to public health dental services at other DHB's in New Zealand.

1.6 Structure of thesis

Chapter 2 provides a review of the available literature on patient disengagement to identify common factors, and research gaps. This chapter also includes the research purpose and significance, and two research questions. Chapter 3 describes the mixed methods approach used in the research and why it was selected, the research designs, participant selection and recruitment, data management and analysis. This chapter also explains the UC and CDHB ethics approval process. Chapters 4 and 5 separately describe the quantitative and qualitative findings, respectively. Chapter 6, combines the quantitative and qualitative findings, and discusses how these findings align with wider literature, summarises the studies strengths and weaknesses, provides future research recommendations and ends with a conclusion.

Chapter 2: Literature Review

This chapter reviews national and international patient disengagement literature, with specific reference to child oral health disengagement. The first section introduces the search strategy and the quantity of available literature. The second section explains in more detail, four factors that predominately influence oral health disengagement. This is followed by the third section which describes the research gaps and suggests areas for future research. The chapter closes with a summary, followed by the research purpose and significance and two research questions.

2.1 Search strategy

A thorough literature review of patient disengagement and oral health patient disengagement revealed that limited information is available on either topic. The review also found there are no systematic reviews or meta-analysis available on either topic. Therefore, the current review focused on search terms that were believed to be the most representative of patient disengagement and more specifically, child oral health patient disengagement. The terms searched began broad to get an overview of the quantity of the available literature. Examples of the terms searched are: oral health and service disengagement, oral health and service engagement, child oral health and service disengagement, and oral health and mixed methods.

Terms were searched in New Zealand Government websites (the MoH and the Ministry of Social Development (MSD), Google Scholar and other informative and respected international oral health websites which included: World Health Organisation, American Dental Association, PubMed (a free full-text archive of

biomedical and life sciences journal literature at the USA National Institutes of Health's National Library of Medicine), Colgate, McLean's and Te Ao Marama (The New Zealand Māori Dental Association). Terms were also searched in the University of Canterbury's library database Science Direct, which belongs to Elsevier.

Using Google Scholar as an example, the terms were searched and an abundance of articles were returned; for example, approximately 21,000 were returned after searching the term child oral health service disengagement, and 2,290,000 were returned when oral health and mixed methods search terms were employed. However, many of the returned articles included oral health diseases, different clinical divisions within dentistry, smoking and some reference to mental health services. Because these articles did not relate to the current research topic, the search terms were refined and made more specific to the research topic.

The refined terms were, child dentistry and parental service disengagement, child dentistry and parental engagement, and dental service disengagement and mixed methods. The refined terms saw a reduction in articles returned. Child dentistry and parent service disengagement returned 12,700 articles, while dental service disengagement and mixed methods returned 16,000 articles.

Articles published between 1970 and 2015 were only reviewed. This year bracket was selected because it represents the spread of change in dentistry. The mid 1960s saw professional changes in dentistry, followed by the modernisation of dental equipment and improved pain relief, to the current state of applying contemporary health models to the sector.

After the refined terms were searched, only articles that appeared on the first webpage had their titles and abstracts reviewed to check their relevance to the

current research questions. If these articles were relevant, they were electronically saved, and then categorised into folders. Separate folders meant articles could be neatly managed, making it easier to reference when writing the literature review. For example, articles discussing a parent or caregivers role in patient disengagement were placed in a ‘social disengagement folder’ and articles discussing disengagement caused by anxiety and fear were stored in the ‘emotional disengagement folder’.

The review resulted in a total of 109 references being used to develop a well-rounded literature review, setting the scene for the current research.

2.2 Recurring factors

From the available literature, authors generally agreed that patients at greater risk of experiencing disengagement are more likely to be low socio-economic, less educated, identify as an ethnic minority, young and experience language barriers (Canvin et al., 2007; Donaldson et al., 2008). Authors also describe how these characteristics are coupled with complex relationships, occurring within a patients social, economic, cultural and personal circumstances, making it difficult for health professionals to address patient disengagement (Listl, 2012; Parker et al., 2012). When reviewing the literature, four factors appeared to be commonly noted by authors as heavily influencing whether a patient does or does not engage. These four factors are the social environment, emotional resilience, service functionality and service perception, and the built environment. Each factor will be discussed separately, with specific reference made to how the factor affects patient disengagement with oral health services.

2.2.1 Disengagement and the social environment

A person's social environment encompasses a number of intricate and dynamic relationships (Fisher-Owens et al., 2007). These relationships can be extremely influential on personal behaviour and are difficult to understand because they affect families differently (Fisher-Owens et al., 2007).

In psychology, the influence the social environment has on a person's behaviour is often described in terms of parent-child relationship (Bukatko, 2008; Gray, 2007). The parent-child relationship is often used as an example because it shows just how influential the parent or caregiver can be towards their child's behaviour.

A well-known theory illustrating this relationship is the Observational Learning Theory developed by Albert Bandura (Gray, 2007, p. 123). Bandura's theory explains how people learn through observation. People observe others to "gain knowledge about the kinds of things that people do in particular settings" (Gray, 2007, p. 123). Another theory founded by Bandura is the Social Learning Theory, which specifically refers to the parent-child relationship (Bukatko, 2008). The Social Learning Theory explains how children view parents and other important people in their lives as "models". How children view these "models" is important, because children will imitate their behaviour, whether good or bad. Bandura discovered children "who observe a model committing a prohibited act, are more likely to perform the act themselves, whereas children observing a model who resists temptation will commit fewer transgressions" (Bukatko, 2008, p. 320). Blecke's (1990) research on child health and self-care within a family context supports Bandura's findings describing how "the practice of health habits by children is related to parental supervision and management" (Blecke, 1990, p. 289).

More broadly, Kuh et al. (2003) believes the theories described by Bandura can apply to the person's whole life course. Kuh et al. (2003) explains how life course epidemiology is an inter-disciplinary framework, bringing together sociology, psychology and biology, to describe health and human development. This theory can be used to discover "how socially pattered exposures during childhood, adolescence and early adult life influence adult disease" (p. 778). Fisher and colleague's research on Global Caries Initiative (GCI) and policy, also recognise the influence the social interactions have on dental disease. Fisher et al. (2012) believes the influences are manageable and explains how health behaviours are modifiable, "particularly if introduced early in life" (p. 170).

Even though child oral health disengagement literature is limited, there is a moderate amount of literature discussing the influence social relationships have on child oral health. Duijster et al.'s (2013) study on oral health and family functioning found that parental attitudes and behaviours influence how they care for their child's oral health. Dawkins et al.'s (2013) research on factors associated with dental caries for children visiting mobile dental clinics had similar findings. Dawkins et al.'s (2013) explained how some children miss out on dental care because "parents are not able to take their children to dentists or are not motivated enough to seek dental care for their children" (p. 2).

Many oral health professionals acknowledge the influential role parents or caregivers have on the child's behaviour, but because health inequalities remain, there is no certainty on how to successfully address behaviour. Some governments and dental services offer free or subsidised care as a way to increase engagement and establish an oral health conversation. This is an opportunity to build knowledge and

awareness for families, who may otherwise be less engaged when financial barriers exist. However, the incentive of low cost dental care is not always enough. Wang and Aspelund (2009) discovered, reducing cost alone does not guarantee engagement, noting some “studies have shown that 12% to 17% of children recalled for free-of-charge dental care do not attend” (p. 11). Rowan-Legg (2013) agrees, and as found in one study, giving Nova Scotia children access to a universal publicly financed dental insurance program did not eliminate disparities in caries rates based on socioeconomic status.

Literature reviewing oral health patient disengagement and the social environment display how susceptible patients and families can be in this environment and how influential the parent or caregiver can be towards their child’s oral health behaviour (Duijster et al., 2013; Yi-Ling et al., 2013). Changing behaviour is difficult and as noted above, it can be hard to address because of the diversity within and across families. Social determinants reflect a family’s likelihood to engage. For example, even when dental services offer free or subsidised care, factors working around the family, such as public transport accessibility or cost, still have a strong influence on current engagement. Holistic health or patient centred care aims to address social determinants of health by taking into consideration the individual or families’ whole lifestyle context (British Columbia, 2011; Moursi, 2003). This creates an improved understanding for support services to identify barriers and develop effective support systems.

2.2.2 Disengagement and emotional resilience

Disengagement is also deeply connected to a person’s emotional wellbeing. Anxiety and phobia are two disorders that disrupt engagement (Armfield, Stewart, &

Spencer, 2007; Moore et al., 2004). Anxiety is defined as, “a feeling of worry, nervousness or unease about something with an uncertain outcome” (Oxford University Press, 2016a). A phobia is defined as, “an extreme or irrational fear of or aversion to something” (Oxford University Press, 2016e).

Understanding the cause of anxiety or phobia is difficult, and stimuli that prompt anxiety or phobia differ from person to person. The Generalised Anxiety Disorder (GAD) is a model used to explain disengagement through anxiety. The model describes how exposure to a stimulus in the future is manageable, but when the stimulus becomes closer, the person is more likely to become anxious and avoid the stimulus all together (Behar, DiMarco, Heckler, Mohlman, & Staples, 2009).

Having the ability to withstand or possibly overcome a stimulus depends on the person’s resilience. People with a low resilience may be less likely to overcome their disorder and continue to disengage (Bukatko, 2008). Others may try to justify their disengagement to make themselves feel better, as described by the Moral Disengagement Theory (Cleemput, Vandebosch, & Pabian, 2014). The Moral Disengagement Theory describes how a person’s anxiety and guilt can be relieved by justifying and rationalising harmful acts. The theory is predominately confined to the education sector and is used to explain bullying (Cleemput et al., 2014).

In health, it may be possible to apply concepts of the Moral Disengagement Theory to patient disengagement. If this was successful, the theory could be insightful and offer the justification of disengagement with a health service. However, while disengagement in itself is not a harmful act, frequent disengagement could be. With child disengagement, the theory may be used to explain parent or caregiver justification for their disengagement. For example, the justification for their child’s

disengagement may be their past experience and feeling that their visit was not beneficial. Parents and caregivers may also feel less guilty if their justification for disengagement has been out of their control. Examples of this could be, the service rescheduling or cancelling their preferred appointment, or public transport being delayed. These situations may delay the urgency for future re-engagement.

In oral health, patient disengagement due to psychological disorders is extremely common for children, adolescents and adults (Armfield et al., 2007; Moore et al., 2004). Colgate-Palmolive Company (2015) estimated that “9 to 15% of Americans avoid seeing the dentist” because they become anxious or fearful at the thought of attending an appointment, and in Britain, people who “didn’t see a dentist regularly said that fear was the main reason” (Colgate-Palmolive Company, 2015).

Research by Moore et al. (2004) and Armfield et al. (2007) refer to Berggren and Meynert’s 1984 vicious circle of dental anxiety in their research. Berggren and Meynert’s vicious circle has four steps illustrating how disengagement is cyclic. Findings from Moore et al. (2004) and Armfield et al. (2007) identify how some of Berggren and Meynert’s steps are present in their research. Moore et al. (2004) explained how one participant who had a traumatic dental experience as a child, now has “dreadful anxiety about being entrapped and forced into treatment situations” (p. 4). Their study mentioned another instance where a participant was overly embarrassed of their oral health (Moore et al., 2004). Fearing the reaction of their dentist, the participant deferred their visit. Armfield et al. (2007) concluded, “people with high dental fear are more likely to delay treatment” (p. 1) and the same people were also “expected to make their next visit only when they experienced pain or a problem” (p. 6).

For children, dental anxiety and phobia developing at a young age needs to be addressed promptly. Often when disorders are not addressed in a timely manner, the child will continue to experience negative perceptions, increasing the likelihood of disengagement (Listl, 2012).

A child's anxiety and phobia is often closely related to their parent or caregiver's emotional resilience. Parents and caregivers who are unable to overcome their own anxiety or phobia may struggle to support their child's emotional resilience. Yi-Ling et al. (2013) looked into the relationship of direct and indirect pathways of children's dental fear in Taiwan. The study found parental pathways have an influential role, particularly for mothers. Yi-Ling et al. (2013) explains how "dental fear in low income children is associated with experiences learned through models (e.g., the mother, sister, or peers)" (p. 5). This finding ties into the social learning theory discussed in the previous section.

One irony with addressing child dental anxiety and phobia is its relation to frequent disengagement with preventative care services. Frequent disengagement with preventative care services can mean preventable issues remain undiagnosed. When the issue is identified, it is usually in an advanced stage and often, secondary care is required. Engaging with secondary care services is invasive, often reinforcing the patient's anxiety or phobia.

2.2.3 Disengagement and service functionality and perception

Service functionality and service perception are two important factors influencing the likelihood of disengagement. A service that functions well will demonstrate "the quality of being suited to serve a purpose well" (Oxford University Press, 2016c) and

having a good service perception will influence the “way in which something is regarded, understood or interpreted” (Oxford University Press, 2016d). Services may not realise the impact their service functionality and service perception has, on disengagement.

In health, service functionality and service perceptions are closely tied to patient disengagement (Canvin et al., 2007). Health services that do not communicate clearly with patients and their families, misunderstand cultural competency, and are expensive, increase the chance of patient disengagement (Best Start Resource Centre, 2006; Canvin et al., 2007; Jacobs et al., 2004; Williams & Gelbier, 1998). The role of frontline staff is also important for ensuring patient engagement.

Research by Ludeke et al. (2012) looked at initial engagement for Pacific Islands patients in regards to cultural competency and frontline staff. Ludeke et al.’s (2012) research involved medical receptionists and found they “were reported to highly influence the comfort of Pacific Islands patients presenting for care” (p. 127). Ludeke et al. (2012) found engagement for Pacific Islands families, was linked to patient dignity and feeling welcomed, but more importantly, how the service understood cultural competency (p.127).

Services that achieve initial engagement by booking an appointment, then face the next challenge of consultation etiquette. During the consultation, poor communication and constant reference to clinical terminology can create patient discomfort. This discomfort can make the patient feel disconnected from the consultation which may make them reconsider ongoing engagement with the service. A report by the Department of Public Health England (2014) gives examples of how this situation can be easily diffused. The report stated, services need to

remember not to use “threatening, patronising or prescriptive language” (Public Health England, 2014, p. 76). Reducing this type of language will help create patient comfort and encourage future engagement (Public Health England, 2014).

Reisberg’s (1996) research on customer satisfaction in healthcare also found that patient comfort and perception of the service can support engagement. Service roadblocks can be reduced if customers feel, “important, recognized, and appreciated” as well as “treated fairly and appropriately” (p. 12).

Jacobs et al.’s (2004) research is similar and displays how understanding patient need can increase engagement. They found a significant relationship between health practices using interpreter services and reducing patient disengagement. Jacobs et al. (2004) concluded, “a patient who used the new interpreter services had significant increases in the receipt of preventive services, physician visits, and prescription drugs” at a moderate cost (p. 867). Despite the benefits of interpreter services, Jacobs et al.’s (2004) also found that fewer health practices use interpreter services because of the associated costs. However, health services need to consider the cost of missed appointments.

Health services also need to consider their means of communication. Woolford et al.’s (2011) obesity research involved distributing health information via text messaging. The results concluded, text messaging is an effective and acceptable way for health services to communicate information to adolescences and increase their engagement. However, the amount of engagement depends on the wording of the text message and the type of information that is delivered. Woolford et al. (2011) also concluded that this is a research area that requires further exploration. In oral health, an early study by Shmarak in the 1970s began to explore the use of

technology and patient engagement. Shmarak (1971) investigated whether a receptionist using the landline to contact patients about appointment reminders would be more effective than posting out appointment reminders. The results confirmed that receptionists phoning the patient increased patient engagement, because patients felt more of a personal connection, in comparison to receiving postal mail.

Despite Shmarak's (1971) findings for the use of technology, the topic remained relatively stagnant until 2014. Research in 2014 used a more advanced technique to improve oral health self-care. Schluter et al. (2015) sent text message reminders to young adolescents to increase brushing frequencies and reinforce good oral health self-care habits. Like Woolford et al. (2011), Schluter et al.'s (2015) study discovered the frequency of brushing increased, especially when text messages were positive and straightforward to read.

A recent movement in the health sector is the recognition of holistic health and patient centred care principles to improve patient engagement. These principles ensure the patient and their family are situated at the centre of their care plan and are actively involved in their health care options (British Columbia, 2011; Mitchell, 2014; Moursi, 2003). Health services positioned around the patient and their family are believed to create supportive pathways, which reduce or prevent the possibility of unmet visits (Moursi, 2003). An example of this would be when the health service knows the patient can only attend weekend appointments. With this information, staff should only book appointments for the patient in the weekend, and not assume the patient can attend any appointment. The principles also have a specific point for understanding a patient's culture (Moursi, 2003). For example, the health service

may ask whether the patient wants to try herbal medicines before pharmaceutical drugs. The involvement of the patient and their family can identify the reasons for patient disengagement and be used to prevent further disengagement. For this reason, it is essential holistic health and patient centred care continues to inform or at least be considered for ongoing health service development (Moursi, 2003).

While there have been significant changes in the dental surgeries with modernised equipment, improved pain relief and computerised patient management systems, disengagement remains a problem, especially for vulnerable families. Service perception may not have kept up to speed with physical changes and may explain hesitation around engagement. However, the introduction of dental nurses and dental therapists display some form of patient centred care and holistic health, as their role was developed with the purpose of building a rapport with patients and their families.

Partrick et al. (2006) and Nash (2009) researched the role of dental nurses, latterly known as dental therapists. Both authors discuss the universal role of dental nurses and their importance of getting to know their patients. Partrick et al. (2006) discusses the introduction and role of the dental nurse and how originally, the significant part of their role was bridging the gap between the patient and dentist. Nash (2009) had similar thoughts, and explained how dental therapists “have been employed internationally to improve access to oral health care for children” (p. 446). Nash (2009) believed utilising dental therapists is an effective way for providing care to children.

However, research by Davis et al. (2007) shows how the role of the dental therapist is becoming less patient focused. Davis et al.’s (2007) research on dental graduates

and public responsibility, places concern over Nash (2009) and Partrick et al.'s (2006) description of the dental therapist's role. Davis et al. (2007) describes how new graduates are less socially aware, culturally sensitive and community-orientated (p. 1009). There appears to be a shift away from holistic health and patient centred care towards economic driven dentistry. This is causing some dentists to move away from their moral obligations to a business orientated culture. Davis et al. (2007) believes, to improve engagement with the population it serves, education providers need to focus on creating a culturally diverse workforce and "better outreach efforts to improve access to care" (p. 1014).

Patient disengagement appears to be influenced by the services functionality and perception. Services that understand their patient needs will have a greater chance of reaching patients that are most likely to disengage. Those services that have poor engagement should consider incorporating holistic health and patient centred care principles.

2.2.4 Disengagement and the built environment

There is an abundance of literature discussing the built environment and health, but the notion of the built environment is broad (Aboelata, 2004; Marco, 2015; Perdue, Stone, & Gostin, 2003). The Prevention Institute's definition of the built environment was used, because of its research in the health sector. The institute defines the built environment as, "the physical structures and infrastructure of communities" in relation to accessibility and the design of communities (Aboelata, 2004, p. 1).

In health, to increase engagement, the built environment should be well designed and functional, in the hopes to reduce accessibility issues and create supportive

networks (Aboelata, 2004). Built environments that achieve this are easier to navigate, readily available, and usually have other support services closely linked which promote holistic health.

While patients and their families need to take some responsibility for how they navigate the built environment, health services and town planners also need to be held accountable for their role. When developing these environments, consultation or representation of user groups should be considered. Research on environmental design and health, points towards a balance of responsibility between health services, developers and public health professionals (Aboelata, 2004; Perdue et al., 2003). Perdue et al. (2003) believe agencies who design the built environment should work closely with public health advocates and health planners. When these agencies are excluded from the health design process, it can contribute to poor overall health outcomes.

Suggestions on how to improve oral health engagement, while considering the built environment, were recommended by Marco (2015). Marco's (2015) research used Geographic Information Systems (GIS) to look at the built environment and access to dental care for Medicad patients. Two recommendations made by Marco (2015) were, to "increase the number of community health centres providing dental services" and to "improve access to public transportation" (p. 1).

The reorientation of public dental services in New Zealand is aligned with Marco's (2015) suggestion of transport. Following the reorientation, the majority of DHB's incorporated a mobile dental service into their service delivery. This change saw an increase of utilisation rates across DHB's, as documented in the 2014/2015 annual update of the New Zealand Health survey (Ministry of Health, 2015a). The update

saw an increased number of children had visited a dental care professional in the past 12 months (Ministry of Health, 2015a). The introduction of mobile dental services appears to have improved accessibility to preventative care offered by public dental services. However, children with an ethnic minority and those living in high deprivation areas, remain a priority for improving oral health service accessibility in New Zealand (Ministry of Health, 2015a; Whyman et al., 2012).

Co-location of health services increases accessibility and availability to primary health care, particularly for marginalised populations. Co-location of dental services accompanied by general practice can, reduce the distance patients need to travel to different health services, offer same day referrals and reduce the number of days required off work (Pourat, Martinez, & Crall, 2015). Factors behind co-location appear to enhance patient centred care (Pourat et al., 2015). However, while co-location appears beneficial, it is important the services are culturally acceptable, appropriate and safe for all service users.

Another option to improve health status is through the design of the built environment, with the help of Health Impact Assessments (HIA). HIA can be a valuable tool to keep planners and support staff accountable for ‘healthy designs’ that meet the needs of the community. HIA are based on “democracy, equity, sustainability and ethical use of evidence” (Gottlieb, Egerter, & Braveman, 2011) and can be used as a guide for designers who work outside the health sector as a way to keep health care at the core of new designs.

2.3 *Research gaps*

A number of research gaps were identified during the literature review. These gaps include research methods, measuring disengagement and the incorporation of holistic health principles. The impact these gaps have on disengagement are briefly discussed, as well as future research that can fill these gaps.

Disengagement literature places less emphasis on the experience of disengaged patients and their families, with fewer studies utilising qualitative research methods. While quantitative methods are effective at identifying disengagement location and frequency, qualitative methods allow the researcher to uncover how and why disengagement occurs.

Having the ability to extract information from people directly affected by disengagement and the opportunity to learn about their disengagement can help inform researchers on where to make evidence based recommendations. When these recommendations are passed on to health services, it creates a better opportunity of meeting the needs of disengaged patients and their families. Anderson (2010) believes, research that uses qualitative methods are more useful for policy makers because it describes the setting where policy will be implemented in greater detail.

Oral health disengagement is influenced by the patient's social, economic and emotional circumstances, service functionality and perception, as well as the built environment. Using a method that involves disengaged patients or their families has a greater chance of accurately informing services about disengagement causes and uncovering accurate suggestions to improve patient engagement.

Reasons why researchers maybe hesitant to use qualitative methods is related to the time required, ethical approval, resource cost, participant identification, recruitment and sustainability, and confident interpretations of results (Anderson, 2010; Sale, Lohfeld, & Brazil, 2002).

Another option to explore is mixing both methods (Creswell, 1994; Sale et al., 2002). Mixing methods offers strength by combining concepts from both quantitative and qualitative methods (Creswell, 1994; Ivankova, Creswell, & Stick, 2006). However, mixing methods is not often undertaken usually because it is time consuming, and requires knowledge of data collection and analysis of both data types (Ivankova et al., 2006).

Another gap needing review is the validation of recorded disengagement data. Despite patient disengagement events typically being coded as a binary outcome, recording of the outcome differed across health services and countries. For example, the NHS in the UK defines disengagement in terms of Did Not Attend (DNA). That is, a patient who “did not attend and gave no advance warning” or “arrived late and could not be seen” (National Health Service, 1998, p. 3). In the United States, health services refer to a disengaged patient as a “No Show” (MedicineNet, 2015). In New Zealand, the Auckland DHB and Waitemata DHB define a DNA as, “any patient that does not show up for an appointment, assessment or procedure, or cancels less than 24 hours before the appointment” (Pacific Peoples Health, 2014, p. 12). Different definitions are also noted across DHB’s, with the CDHB CDS defining patient disengagement as, “a patient who does not turn up or gives no advance warning within 15 minutes” (S. Julian, personal communication, January 20, 2015).

The various definitions of disengagement reporting across health services both nationally and internationally makes comparison of results difficult. There may also be concerns surrounding the consistency of how people interpret and report their own definition of disengagement.

Another gap in the literature was the use of holistic health and patient centred care principles to frame the research. Literature published in early 2000, began to touch on these principles (British Columbia, 2011; Mitchell, 2014). The literature review found that while researchers touch on the principles, none specifically based their whole research design embodying these principles. Moursi (2003) discusses how there is little consistency around the meaning of patient centred care, which may explain why drawing conclusions on the research findings vary. However, international research describes how health services are continuing to prioritise patient centred care into health service delivery and health research (British Columbia, 2011; Fisher-Owens et al., 2007; Mitchell, 2014).

To fill the research gaps, it is important future research incorporates holistic health and patient centred care principles. These principles will help researchers gain a better understanding of the intricate relationships that patients and their families experience and uncover authentic reasons as to why disengagement occurs.

2.4 Summary

The review of patient disengagement and oral health patient disengagement literature shows, research in both areas is generally limited. What authors generally agree on are patient disengagement characteristics and how disengagement is caused by intricate relationships within a patient's lifestyle.

The current review identified four factors that influence disengagement with oral health services, as well as three research gaps. The four factors are the patient's social circumstances, emotional resilience, services functionality and perception, and the circumstances in which they live. These factors individually or collectively influence each patient's engagement opportunity. Because of the intricacies between factors, researching them is highly desirable but often difficult. This may explain why these factors have never sustainably reduced disengagement.

Some health researchers may also be hesitant about researching this area because it may uncover answers that identify health services as being partly responsible for patient disengagement. However, this information should not be viewed as negative, because it can guide service delivery development and direction. The opportunity to undertake research involving the target population creates authentic data and is therefore highly valuable.

Future researchers should continue exploring the research gaps identified from the review. Investigating the research method, disengagement measurement, holistic health and patient centred care principles are all examples of where further research would lead to a better understanding of patient disengagement.

2.5 Purpose of the research

The purpose of this research is to provide the CDS with contemporary information on pre-schooler and clinic appointment failure. A mixed methods approach will be used to initially identify pre-schooler appointment failure characteristics and clinic location in Canterbury and South Canterbury between 2010 and 2014. These empirical findings will then inform the qualitative method's strengths based focus groups, with participant answers describing reasons for appointment failure and

recommendations for reengagement and service improvement. Involving parents and caregivers who have children enrolled with the CDS will aim to address the research gap concerning patient centred care.

2.6 Significance of research

While acknowledged to be important, relatively little national and local research pertains to oral health disengagement. In seeking to increase oral health profiles, and reducing dental ill-health burden, appropriately designed and conducted research is vital. In recent years, the CDS has developed and implemented an electronic-based system that captures preschool records and appointment histories that enables valid and reliable localised contemporary epidemiological investigations. However, adopting a mixed methods approach means the epidemiological findings can be extended, going a step further to ask current service users about their appointment failure and their service recommendations. This approach has not been used by the CDS before and places them in a unique position with findings that are a combination of robust data and authentic responses from disengaged participants.

It is also believed this is the first disengagement research to be undertaken nationally by a DHB and therefore results should be shared with other DHBs, as findings could share some similarities with other DHB populations.

2.7 Research questions

Motivated by the literature, associated gaps, and the overarching objectives of the study, two primary research questions are explored:

1. Identify the characteristics and location of pre-schooler appointment failure with the CDS between 2010 and 2014.
2. Ask pre-school parents and caregivers to identify factors causing appointment failure and their recommendations to improve service engagement.

Chapter 3: Methods

This chapter begins by explaining the mixed methods approach and then splits into two sections. The first section discusses the quantitative method (Phase one), its study design, sample size, variables and procedure used. Data management and statistical analysis are then described. The second section discusses the qualitative method (Phase two), its study design and participant criteria, followed by focus group recruitment and procedure. Qualitative data management and analysis are then discussed. Lastly, the UC and CDHB ethics approval process is explained.

3.1 Mixed methods

In health, routinely recorded patient data is often used to identify populations at risk, utilisation rates, and as a measure of service progress and outcomes. For some researchers, using this data can be appealing because there is no need for data collection. However, aside from quantitative data identifying location and frequency statistics, health services and governments also have an interest in understanding how and why particular health behaviours occur.

Qualitative research aims to uncover or illuminate the reasoning behind patient behaviour. By involving patients and sometimes their families in the research, their perspectives provide a deeper conceptualisation and understanding of behaviour; something typically missing when quantitative methods are used.

Despite the depth offered from qualitative methods, the method is not often prioritised for several reasons. Data collection can be time consuming and data analysis is often lengthy and tedious (Anderson, 2010; Onwuegbuzie, Dickinson, Leech, & Zoran, 2009). Deciding whether data saturation has been met can also be

difficult (Fusch & Ness, 2015) .Research findings are context specific and while they represent the views of the current participants, they may not be representative of the wider population and therefore, can only be used as a guide to inform future research (Anderson, 2010; Fusch & Ness, 2015).

Prior to the 1970s, quantitative and qualitative methods were viewed in isolation. However, the concept of method integration thrived in the 1970s and 1980s (Sale et al., 2002). What mixed methods can offer researchers is additional strength and depth to any research topic (Creswell, 1994; Johnson, Onwuegbuzie, & Turner, 2007; Onwuegbuzie et al., 2009). Strength and depth can be added by having the strengths of individual methods, for example, quantitative and qualitative, combine to inform the mixed method. Disadvantages of mixing both methods include the extensive time required, selected method in relation to data supplied, selected analysis and researcher expertise (Creswell, 1994; Ivankova et al., 2006; Sale et al., 2002; Weitzman, 1999). It is also important that the researcher knows at what stage the methods will be mixed. Examples of this may be during data collection, data analysis, or in the research discussion (Ivankova et al., 2006).

The current research uses a mixed methods approach because the CDS is interested in going beyond quantifying pre-schooler appointment failure, captured in routinely collected variables, to obtain an in-depth understanding of why parents and caregiver's disengage with the service, and their recommendations to enable engagement.

A low risk explanatory sequential design was used to achieve the desired outcome (Ivankova et al., 2006). This design is split into two phases with findings from Phase one (quantitative method) informing the direction of Phase two (qualitative method).

Phase one will quantify the characteristics and clinic locations of pre-school appointment failure, with the results being used to inform the geographic location for phase two, parent and caregiver focus groups. Integrating the methods will be most evident in the research discussion, which will show a more robust picture of factors that influence parent and caregivers to fail appointments with the CDS (Ivankova et al., 2006).

3.2 Quantitative method (Phase one)

3.2.1 Study design

Phase one is a retrospective analysis of a prospectively collected closed cohort of eligible Canterbury and South Canterbury pre-school children born in 2010 and enrolled with the CDS between January 1st 2010 and December 31st 2014. Prior to 2010, the CDS did not electronically record patient data and instead used paper files. The sample utilised routine patient and appointment information collected and stored on the services database, Titanium. The closed cohort (excluding children born elsewhere who moved into the CDHB region) allowed a fixed number of pre-school children born in 2010 to be followed. An open cohort was considered inappropriate due to the difficulty in obtaining pre-schoolers appointment history data for those outside the CDHB. DHB's use different patient management software, with incompatible systems currently making it difficult to share patient information and manage transient behaviour.

3.2.2 Sample

Pre-schoolers born in 2010 were selected for the research due to their length of enrolment with the CDS. The four year period captures the maximum number of

years a pre-schooler will be examined and treated in CDCs, before transferring to the primary and intermediate school system.

3.2.3 Variables

Outcome variable

The outcome variable was a completed or failed dental appointment. A completed appointment was defined as a pre-schooler who received care at their scheduled appointment. A failed appointment was defined as a pre-schooler who did not attend their scheduled appointment and their parent or caregiver did not give more than 15 minutes notification. Parents or caregivers who provided sufficient notification had the opportunity to cancel or reschedule their appointment, with the change recorded in Titanium. All appointments are electronically recorded in a pre-schoolers patient file.

Independent variables

Six independent variables routinely collected by the CDS and believed to have an effect on the outcome variable were, sex, ethnicity, socio-economic status, age at appointment, clinic location, and appointment type (examination, unplanned treatment, and planned treatment).

Ethnicity

Pre-schooler ethnicity was determined by their parent or caregiver at CDS enrolment. The ethnic groups followed the Statistics New Zealand Ethnic Group Profiles (Statistics New Zealand, 2016). The classification grouped ethnicity into hierarchical levels. Pre-schoolers in the dataset were recorded as belonging to one

ethnic group only. The order of ethnicity in the research was New Zealand European, Māori, Pacific Islands, Asian and Other. Undisclosed or unknown ethnicities were set to missing during data cleaning.

Socio-economic status

Socio-economic status was measured using the New Zealand Deprivation Index (NZDep) (Salmond & Cramptom, 2012). The index uses socio-economic status to describe a scale of deprivation from 1 to 10, where 1 is an area of least deprivation and 10 an area of high deprivation (Salmond & Cramptom, 2012, p. 8). The deprivation levels were then collapsed into five quintiles, in line with many New Zealand public health reports.

Age at appointment

The age at appointment variable was not available in the raw data. Age at appointment was calculated in Stata 12 by subtracting the date of birth from the appointment date.

Clinic location

Clinic location was measured in relation to the CDS's fixed 'hub' clinics. The service has 14 fixed clinics across Canterbury and South Canterbury. The majority of fixed clinics are located in the Christchurch metropolitan area and are linked with a mobile van or mobile clinic which services rural communities. Pre-school appointment data from the mobile clinics were matched to their fixed 'home' clinic.

Appointment type

The CDS uses three appointment types: 15 minutes examination, 30 minutes unplanned treatment and 45 minutes planned treatment. For this data, there was no guarantee that unplanned treatment appointments and planned treatment appointments were recorded in the correct time slot. Therefore, unplanned treatment and planned treatment appointments were combined. However, both treatment types can be clearly distinguished from a 15 minutes examination.

3.2.4 Procedure

Data was requested from the CDHB CDS. The request was approved by the CDS Clinical Director, Dr Martin Lee, following the CDHB data registering process. The Clinical Director extracted the patient and appointment data from Titanium. Data were presented in two Microsoft Access 2010 software files labelled Patient Data and Appointment Data.

The New Zealand health system allocates a National Health Index number (NHI) to all patients registered with a health provider (Ministry of Health, 2012b).The NHI is an unique identification indicator which contains personal contact information and patient history. To protect the privacy of pre-school children, their NHI was linked to a Patient Identification Number (patkey). The patkey was referred to in the dataset and the NHI was removed.

Patient confidentiality was maintained by storing the two data files on secured computers at the University of Canterbury (UC) and CDHB. In line with the ethics approval, having data stored on these secured sites meant only the researcher and supervisors had access to the data.

The two data files were imported into Stata version12.0 (StataCorp, College Station, Texas, USA), a statistical management and analysis program. Data were cleaned using Stata's in built Do File function and involved: renaming and relabelling variables, removing duplicate patients (explained below), geo-coding address data to generate NZDep scores, encoding and recoding variables, removal of all redundant variables and patient identifying variables, and data merging to create the research dataset. This dataset was used for all pursuant analyses.

3.2.5 Data management

There were three pivotal data management stages: duplicate data, geo-coding data and merging data. These are each separately described below.

Duplicates

Duplicate data were identified using Stata's duplicate report command. The report identified duplicate NHI numbers in the patient data file only. If a pre-schooler's NHI occurred more than once, the first record was retained and subsequent additional NHI's were removed to ensure each pre-schooler only had one NHI in the dataset.

Geo-coding

The raw patient file data from Titanium did not include a socioeconomic variable. To find a patient's socio-economic status, the pre-schoolers last known address was geo-coded to the 2013 New Zealand Census. This involved using Esam, a geo-coding programme, which matched the pre-schoolers last known address in Titanium to address data from the 2013 New Zealand Census. The output address from Esam was then matched to the corresponding NZDep index.

Concern rose around the reliability of the 2013 Census data, especially after the 2010 and 2011 Canterbury earthquakes. Advice was sort from Dr Clare Salmond, Honorary Fellow from the University of Otago, and lead author of the latest New Zealand Deprivation Index (Atkinson, Salmond, & Crampton, 2014). Dr Salmond confirmed that using the 2013 New Zealand Census data would be reliable (C. Salmond, personal communication, June 5, 2015), (see Appendix One).

Merging data

After the patient and appointment files were cleaned they were ready to be merged into one file. Stata was used to merge data, which was matched on the unique identifier variable, patkey. The potentially re-identifiable NHI variable was deleted from the research data file.

3.2.6 Statistical analysis

Descriptive statistics were initially derived to answer the first research question. For appointment data, descriptive statistics included the mean, standard deviation and range, for examination and treatment appointments that had been completed and failed. Descriptive statistics for patient data included the frequency of pre-schooler ethnicity, sex, socio-economic status and age at appointment. Note that age at appointment could be measured as either a continuous or categorical variable. To test which variable type would be most suitable for the dataset, Akaike Information Criterion (AIC) analysis was performed on age as both a continuous and categorical variable (grouped by year) (Hox, 2002). The AIC statistic for age as a continuous variable was 13,308.45 and for age as a categorical was 13,306.13. While relatively close, the AIC statistic suggested that this categorical form of age was preferred over

the continuous version, and so was applied forthhence. Findings from the first research question informed the second phase of the mixed method's explanatory sequential design.

Because data were clustered by patient and with a binary outcome, secondary analysis involved multi-level mixed-effects logistic regression. This model was used to investigate the relationship that the independent variables would have on engagement. This model yielded odds ratios (ORs) and associated 95% confidence intervals (CIs), which were used to assess the odds of failed appointments for some group of interest compared to their reference group counterparts (Rothman, 2002). The multi-level mixed effects model employed here was composed of both fixed and random effects. For the purpose of this research, fixed effects included: a pre-schooler's sex, ethnicity, and age at appointment. Random effects included: a pre-schooler's socio-economic status and clinic location. Statistical significance of independent variables was assessed using Wald's χ^2 test. Here, $\alpha=0.05$ defined significance.

The multi-level mixed-effects logistic regression model development followed a two-stage process, whereby bivariable models over each candidate independent variable was first investigated, and then a multivariable model was developed that only included those independent variables significant in the bivariable analysis.

3.3 Qualitative method (Phase two)

3.3.1 Study design

Two voluntary parent and caregiver focus groups were used in Phase two. Focus groups were arranged with voluntary help from four services: Pegasus Health, the

city's largest Primary Health Organisation; Nurse Maude, Canterbury's home and community based nursing service; one early childhood education provider and one alternative education unit. The process for participant recruitment is outlined in figure 3.0. The focus groups were informed from Phase one findings and aimed to have 6-8 participants attend. Each focus group was envisioned to run for approximately one hour.

Focus groups were appropriate for this research because they rely on developing conversation amongst participants, which leads to the extraction of rich and authentic data (Bender & Ewbank, 1994; Onwuegbuzie et al., 2009). Bender and Ewbank (1994) believe answers provided by participants reflect their own opinions on familiar topics, developing data authenticity. Onwuegbuzie et al. (2009) explains how focus groups are an efficient data collection method because they are an economical and fast way to obtain "data from multiple participants" (p.2). Because pre-schooler appointment failure with the CDS is under explored, conversations developed amongst participants may scope whether participants perception of appointment failure shares a similar view with the service.

The limitations with focus groups may include ambiguous questions, discomfort amongst participants and the researcher, and low participant engagement (Agee, 2009; Anderson, 2010; Fusch & Ness, 2015). The current research managed these limitations as best as possible. For example, to ensure focus group questions would be understood by all participants and meet the research objective, focus group questions followed a question development framework.

Education providers were consulted to optimise focus group participation. One early childhood education provider and one alternative education provider, both located in

close proximity to a CDC with high appointment failure were consulted on the research topic, and the proposed focus group date, time and location. The purpose of this consultation was to gain support from staff who are engaged with potential participants and support parents and caregivers take part through their own accord.

The order of focus group questions were developed in a way to get the best response from participants. Questions began by informally asking introductory questions, before leading to the key questions around disengagement with the CDS. This technique is believed to make participants feel more comfortable in the group and hopefully lead to questions being answered truthfully (Onwuegbuzie et al., 2009).

Semi-structured interviews were considered, but because the design involves individual conversations with the researcher, the method was rejected because of the study's budget and time constraints. Semi-structured interviews were also rejected because they limit interactive conversations amongst participants. One to one interviews, with the researcher and the participant, uncovers answers which cannot be challenged or further justified by other participants. Gill, Stewart, Treasure, and Chadwick (2008) agree, and explain how semi-structured interviews give less depth, but are easy for follow up information. Semi-structured interviews can also offer greater assurance that participants disclose information without feeling criticised amongst peers. However, the focus groups in this study have been designed to ensure participant safety and comfort.

3.3.2 Participants

The ideal focus group participant would have missed all of their pre-schooler's scheduled dental appointments. However, an assumption can be made that these participants may not be motivated to participate in the research. Participants excluded from the focus groups included parents and caregivers who had attended all scheduled appointments, because it is assumed that they are not influenced by disengagement factors. South Canterbury parents and caregivers were also excluded because Phase one findings identified that the severity of appointment failure is more prominent amongst Canterbury pre-schoolers.

Participant selection was based on a purposeful sample. Koerber and McMichael (2008) describe purposeful sampling as "participants who possess certain traits or qualities" (p.464). Coyne (1997), drawing on Patton's (1990), notes that this sampling method can provide information rich cases and can produce a great deal of information and learnings, if participant selection is robust. Koerber and McMichael (2008) would agree and emphasise the need for the researcher to ensure participants have adequate characteristic variation. This sampling method was appropriate for this research for two reasons; Phase two was based on Phase one findings and Phase two participants had an eligibility criteria.

Eligible participants were any Christchurch parent or caregiver who had at least one pre-schooler currently enrolled in the CDS and eligible for free dental care. Eligible participants also had to have missed at least two scheduled dental appointments. Parents and caregivers were selected because it is assumed that they are responsible for contacting, booking and transporting their pre-schooler to the dental appointment.

Two focus groups were organised, each consisting of six voluntary participants, with only one person being unable to attend on the day. All participants were female and predominately self-identified as European. Nine self-identified as European, two self-identified as Māori and one self-identified as having more than one ethnicity. Participant age was broken into four age brackets. Six identified with being 16-20 years, two as being 21-25 years, one as being 31-35 years, two as being 36-40 years, and one as being 40 years and over.

3.3.3 Procedure

Focus group procedure was broken into three stages: fieldwork documents, participant recruitment and data collection.

Fieldwork documents

Question development involved identifying focus group participants and estimating their health literacy. Having an understanding of their health literacy would help develop suitable focus group questions, information sheet and consent form.

The development of focus group questions were guided by Auckland University Lecturer, Martin Wood. Wood's framework describes four important stages when developing focus group questions (Woods, 2011). The stages are introduction, transition, key question/s and an ending question. By following this framework, it subtly transitions through a participant's dental journey, from their childhood experiences to current experiences with the CDS. For example, the introductory question requires participant reflection of their childhood dental experience. The transition question asks about a participants understanding or perception of the CDS and key questions ask participants about CDS disengagement. Woods (2011) also

believes that by following this framework, when key questions are asked, participants would have developed some rapport with other participants; possibly leading to truthful answers.

Eight focus group questions were developed (see Appendix two) following Wood's framework. Eight is also the recommended number of questions in focus group development by Eliot and associates (2005), who feel it is a manageable number. Questions that would receive a dichotomous yes or no response were avoided because they limit conversation amongst participants (Agee, 2009; Bender & Ewbank, 1994) .

A basic demographic information sheet was developed to record sex, age and ethnicity (see Appendix three). This information would be used to reflect on Phase one findings.

The information sheet and consent form (see Appendix four and five) template were downloaded from the UC Human Ethics Page. Both forms were adapted to fit with the current research. Advice was then sought from Annabell O'Driscoll, the Māori health and wellbeing lecturer at UC. Her role was to review the focus group questions, information sheet and consent form, to make sure the questions and forms were culturally sensitive and not misleading.

After the fieldwork documents were approved by the Māori advisor, they were reviewed by supervisors. The fieldwork documents were then sent with the research application form to the UC Human Ethics Committee for approval, which was subsequently approved (see Appendix six).

Recruitment

The figure below outlines participant recruitment process.

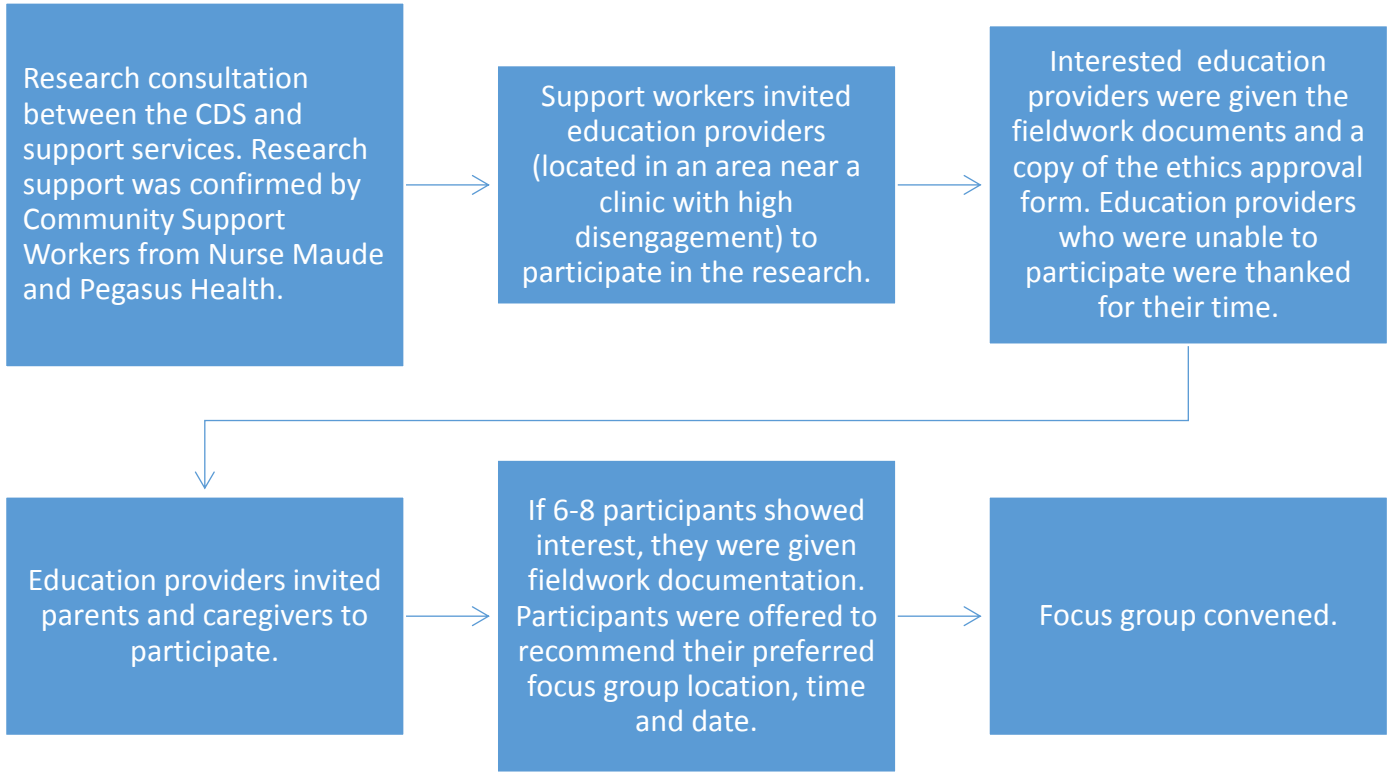

Figure 3.0. Focus group recruitment

Data collection

Data collection took place in a relaxed and informal setting. Creating a relaxed atmosphere where participants felt comfortable would hopefully lead to questions being answered truthfully.

On arrival, participants were offered light refreshments. Then an informal welcome introduced the facilitator to the participants and thanked participants for their time. The purpose and importance of the research was also explained to participants, followed by their role in the research and how their answers can be used to inform the CDS. The information sheet and consent forms were re-read by the facilitator, who then reassured participants that the research is anonymous, and no participants or education providers would be named. The facilitator also gave participants the option to use an alias during the focus group if this made them feel more comfortable.

Participants were then told that the purpose of the focus group is to create conversation amongst participants and that there are no right or wrong answers. Participants were also told they would be called upon if they had not answered a question or contributed to the discussion.

After this, participants were given the option to withdraw from the research and told they could withdraw at any time. The facilitator then collected the signed consent forms and demographic information sheets. The eight focus group questions were asked and answers were digitally recorded. At the same time, brief notes were also being written by the facilitator.

Once data collection had concluded, participants were thanked again for their time, given a free Oral Health Family Kit and the opportunity to go in the draw to win a fifty

dollar grocery hamper. Participants were made aware that focus group transcripts were available on request, and any changes to the transcripts must be actioned within a period of one week.

Notes taken during the focus group and reflective notes were used to complement the digital recording. All notes would be referred to in data analysis, which may complement emerging factors that influence disengagement.

The data collection process was completed again for the second focus group. A decision was made to stop data collection after the second focus group, because no substantively new information was offered, compared to the findings from the first focus group. Therefore, it was believed an acceptable amount of data had been collected to generate factors that influenced disengagement amongst focus group participants.

3.3.4 Qualitative data management

Before transcription, each participant was given a unique reference number to protect their identity. This number would also be referred to in the results section. Participants who used an alias in the focus group also received a reference number, so participant identification would be standardised for all participants in the results section.

The two focus groups were individually transcribed verbatim in a Microsoft Word 2012 file. The transcripts were printed off and manually reviewed. Manual revision involved writing comments on transcripts, identifying possible quotes and areas of general agreement and disagreement amongst participants. Notes written during the focus group and on focus group reflection were rewritten, to make more legible.

Participants who requested a transcript were e-mailed their transcript and given one week to make any necessary changes. Revised transcripts were uploaded into Dedoose, a mixed methods data management and analysis software programme (Dedoose, n.d). Once a transcript is uploaded for qualitative analysis, Dedoose follows a three tiered coding tree: parent code, child code and grandchild code (Dedoose, n.d). The purpose of the coding tree is to help the researcher manage the large amount of data by splitting it into manageable groups. These groups then become refined during qualitative analysis. Initially, codes are decided by the researcher after the manual transcripts are reviewed. An example of the coding tree in the current research is when participants mention technology. Technology would be the parent code, with text messages being the child code. The coding tree is not fixed, and therefore, as the transcripts continue to be revised in Dedoose, more child or grandchild codes may develop from a parent code.

Analytic memos were also used to manage data. In Dedoose, the memos were used as a ‘brain dump’. Reflective notes and participant responses that had created a lot of discussion were stored on a memo. Information stored on analytic memos had the corresponding participant number and would be reviewed during data analysis.

Data management also identified pivotal quotes and patient demographic information. Pivotal quotes were stored in separate analytical memos, but still tied to the participant’s number. A quote was considered pivotal if it answered the second research question or strongly illustrated a participant’s opinion. Participant demographic information was also uploaded into Dedoose, to discover whether there are relationships between codes and participant demographics.

3.3.5 Qualitative analysis

Data analysis involved in-depth thematic analysis for both focus groups. The purpose of thematic analysis was to use an analysis tool that would uncover the main factors affecting disengagement, whilst keeping data authenticity intact. Authenticity remained intact by using an inductive style of analysis which allowed factors affected by disengagement to be based on content gathered from the focus group. This was used instead of a deductive style, which applies a theory to the data. To best support in-depth thematic analysis, data analysis was split into two cycles.

First cycle

The first cycle of analysis revised broad codes developed from the manual transcripts and the written notes. Nine parent codes had been made, coupled with twelve child and six grandchild codes. During this stage in analysis, code definitions remained broad and would become more transparent in second cycle analysis.

Familiarisation of the two transcripts resulted in the use of an affective coding method (Saldana, 2009). This method was selected because it was most suitable to the type of language used amongst participants. Affective coding relies on value and evaluation coding. Value coding is reflective of a “participant’s values, attitudes and beliefs, representing his or her perspectives” (Saldana, 2009, p. 89). Evaluation coding “assigns judgements about the merit and worth of programs or policy” (Saldana, 2009, p. 97). In the current data, participant answers gave recognition of other service users as well as discussing CDS systems and procedures (Saldana, 2009).

As parent, child and grandchild codes emerged from the transcript, Dedoose automatically allocated each code a colour. The frequency of coloured codes is automatically calculated in Dedoose when the user selects a section of the transcript that matched the code. Some participant answers were counted more than once, one time under a parent code and the second time under a child code, because their answer could not be isolated to one code only at this point. An answer counted more than one once is known as simultaneously coding and these codes would be refined in the second cycle of analysis.

After the transcripts were read in full and all codes were colour coded, a code occurrence count was calculated. The code occurrence was used as a guide because it includes simultaneous coding and codes which may have been consistently mentioned by one participant rather than multiple participants.

Second cycle

The code occurrence from first cycle analysis was codified. Codifying is the process of arranging codes in order, enabling you to "organise and group similarly coded data into categories, because they share characteristics" (Saldana, 2009, p. 8). Codifying analysis involved pattern coding and axial coding. Pattern coding pulls together a lot of material and groups them "into a smaller number of sets, themes or constructs" (Saldana, 2009, p. 152). Axial coding "strategically reassembles data that were split or fractured during the initial coding process" (Saldana, 2009, p. 159). They were used because they create code weights, describe code categories, and discuss connections between code categories and subcategories (Saldana, 2009). This adds reliability to the data because amalgamating codes or removing small codes allows refining which can uncover the main factors influencing

disengagement. Codes that were recorded less than fourteen times were removed or combined because individually, they were not adding enough weight or were too similar to another code, for example, text messaging and phone contact were combined under communicating with technology.

Second cycle analysis reviewed the analytical memos and the second research question. Revision of the memos ensured that the code had been mentioned by at least three participants in each focus group, rather than a code being repetitively mentioned by one participant only. Reference was made to the second research question to ensure the factors emerging did accurately address the second research question and could be thoroughly addressed in the discussion chapter.

After codifying and revision of the analytical notes, code occurrence was re-run and another code occurrence count was produced. Codes from this count became the factors that would be used to answer the second research question. These codes were consistent through the first and second cycle of analysis. The four factors identified were, waiting room and dental surgery ambience, staff attitude, physical resources that inhibit accessibility, and communicating with technology. A code that frequently appeared was parent and caregiver childhood dental experience and perception. A decision was made to keep the code, but it was not considered a factor because it did not influence pre-schooler disengagement. The reason the code was retained was so it could be used to draw comparisons between literature and the current findings. Quotes held in the analytical memos supported the four factors and would be placed in the qualitative findings chapter.

3.4 Ethics approval for Phase one and two

Research involving CDHB data required registration and approval from the CDHB research office. This involved completing an Audit Project form, which required information on the research objectives and rationale, data usage and the management of patient confidentiality. The form was signed by the CDS Clinical Director and Service Manager, as well as the General Manager of Older Persons Health, under which the CDS sits. The CDHB approved this research (see Appendix seven).

Ethics approval was then sought from the University of Canterbury Human Ethics Committee (UCHEC). For the purpose of the research, a low risk ethics application was considered appropriate. The requirements for low risk ethics required participants to be voluntary and over the legal age of consent (16 years). Furthermore, they would not be asked any sensitive questions or have their privacy invaded. The forms for ethics approval were downloaded and printed from the University of Canterbury website. The forms were filled in and submitted with the required fieldwork documentation. A physical copy of the forms were sent to the UCHEC office, and electronic copies sent to each supervisor. An electronic copy was retained by the researcher for personal records.

The committee reviewed all the information to ensure participant privacy and confidentiality was kept, the terminology used was appropriate and a participant's role was clearly explained. The committee were also told about the recording of focus groups and a non-influential incentive would be offered to participants for their involvement.

The UCHEC accepted the low risk application form and agreed the study was a minimal risk observational research that did not require ethics committee review. They were confident the study complied with the ethical standards of human experimentation as established by the Helsinki Declaration 1995 (as revised in Edinburgh 2000) and New Zealand's Health and Disability Ethics Committee (HDCE).

Chapter 4: Quantitative results; the characteristics and clinic location of pre-schooler appointment failure between 2010 and 2014

This chapter presents the findings of patient and appointment data collected and supplied by the CDS. Informed by the STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) guidelines (www.strobe-statement.org), the chapter begins by describing the demographics of pre-schoolers eligible for the research and then describes the frequency, location and type of appointments completed and failed during the study period. The crude analysis uses a bivarable model to identify which independent variables have an effect on CDS appointment failure. Adjusted analysis uses a multivariable model to identify which independent variables remain significant after the crude analysis.

4.1 *Pre-schooler demographics*

Overall, there were exactly 7,000 records for children born in 2010 who were enrolled in the CDS over the study period. However, after the removal of duplicate data, 6,986 pre-school children remained eligible. Table 4.0 presents the characteristics of eligible pre-schoolers. The proportion of pre-schoolers reported as Māori and Pacific Islands ethnicities were 9.2% and 3.9% respectively. This differed from the reported figures in the 2013 census data (see Table 4.1), with the proportion of Māori and Pacific Islands ethnicities at 15.8% and 5.22% respectively. Reasons for the variation in ethnicity is unclear and may include both lower levels of access and ethnicity coding problems experienced by the CDS (Canterbury District Health Board, 2016). The proportion of pre-schoolers that were reported as male (50.4%) and female (49.6%) were more consistent with the 2013 census data, with the proportion of males and females reported as 51.1% and 48.9% respectively.

Table 4.0. Characteristics of pre-schoolers enrolled in the Community Dental Service (CDS) between 2010 and 2014 (n=6,986)

	n	(%)
Sex[a]		
Male	3,515	(50.4)
Female	3,459	(49.6)
Ethnicity[b]		
European	5,212	(77.6)
Māori	617	(9.2)
Pacific Islands	263	(3.9)
Asian	520	(7.7)
Other	106	(1.6)
Age at appointment (years)[a]		
0	2	(0.0)
1	876	(12.6)
2	3,344	(47.9)
3	1,798	(25.8)
4	887	(12.7)
5	67	(1.0)
New Zealand Deprivation (quintile)[c]		
1 (least deprived)	1,502	(26.8)
2	1,284	(23.0)
3	1,084	(19.3)
4	1,067	(19.0)
5 (most deprived)	668	(11.9)

Note: [a]missing data for 12 (0.2%); [b]missing data for 268 (3.8%); [c]missing data for 1,381 (19.8%).

Table 4.1. 2013 age and ethnicity census data for 0-4 year olds in the Canterbury region

Dataset: Ethnic group (grouped total responses) by age group and sex, for the census usually resident population count, 2001, 2006, and 2013 (RC, TA, AU)																								
Ethnic group	European			Maori			Pacific Peoples			Asian			Middle Eastern/Latin American/African			Other ethnicity			Total people stated			Not elsewhere included		
Age group	0-4 Years																							
Sex	Total people, sex	Male	Female	Total people, sex	Male	Female	Total people, sex	Male	Female	Total people, sex	Male	Female	Total people, sex	Male	Female	Total people, sex	Male	Female	Total people, sex	Male	Female	Total people, sex	Male	Female
Year	2013																							
Area																								
Canterbury Region	27657	14166	13494	5109	2580	2529	1683	849	834	2838	1392	1446	459	240	222	675	384	291	32220	16479	15741	1290	642	645
Note: Data extracted on 30 Jul 2016 from stats NZ http://www.stats.govt.nz/																								

4.2 Pre-schooler appointments 2010-2014

During the study period, 2010 to 2014, the CDS had scheduled 49,011 appointments. Because the focus of the study was pre-schooler disengagement, appointment data only included completed and failed appointments belonging to eligible pre-schoolers. Of the 49,011 appointments, 18,933 (38.6%) belonged to the eligible participants; the remaining appointments belonged to pre-schoolers who were enrolled in the CDS, but were not born in 2010.

Of the 18,933 appointments, 16,599 (87.7%) were completed and 2,334 (12.3%) failed. The median number of completed appointments was 3, with a range of 1-11 appointments. The median number of failed appointments was 2, with a range of 2-22 appointments.

Appointment types

Over the four year study period, the CDS had completed 13,535 (87.9%) examinations and 3,064 (86.8%) treatment appointments (see Table 4.2). Analysis of appointment failure by appointment type revealed no important difference (p=0.15), suggesting that pre-schoolers are not at greater risk of failing an appointment based on appointment type.

Table 4.2. Frequency of completed and failed appointments by appointment type between 2010 and 2014

Appointment Type	Completed (n)	(%)	Failed (n)	(%)	Total
Examination	13,535	(87.9)	1,868	(12.1)	15,403
Treatment	3,064	(86.8)	466	(13.2)	3,530

Age at appointment

Pre-schoolers aged 0-1.9 years had the lowest number of appointments (1,741 or 9.2%) during the study period. The low number was expected because pre-schoolers in this cohort are under the recommended age (2 years) for a first appointment with the CDS. However, because they have had an appointment, it suggests they may have been identified as being more susceptible to experiencing poor oral health or suffer from a medical condition that impacts their oral health.

Pre-schoolers in the 2-2.9 year age group had the second greatest number of appointments (5,619 or 29.7%). Again, this is expected because they fall within the age cohort for requiring a first dental appointment. Pre-schoolers aged between 3 and 3.9 years of age had the greatest number of appointments (6,913 or 36.6%). This may be because pre-schoolers in this cohort are engaged with early childhood education which creates another platform for delivering oral health messages. After the age of 3-3.9 years, appointments tapered off. Pre-schoolers aged 4 and over had the smallest number of appointments (4,634 or 24.5%), aside from the pre-schoolers in the 0-1.9 age cohort. The reduction in the number of appointments from the age of 3-4.9 years may be due to the time constraints of this thesis. Ideally, each pre-schooler would provide four years of appointment data. However, those born in late 2010 would not have all their appointments captured in the dataset.

Clinics

The frequency of completed and failed appointments differed between CDC locations (see Table 4.3). Clinics located in areas of moderate to high deprivation had a greater number of failed appointments compared to clinics located in areas of least deprivation.

Table 4.3. The frequency of completed and failed appointments per Community Dental Clinic (CDC) between 2010 and 2014

	Completed		Failed		Total
Clinic location	n	(%)	n	(%)	n
Akaroa	33	(97.1)	1	(2.9)	34
Aranui	1,708	(80.5)	415	(19.5)	2,123
Ashburton	1,019	(87.7)	143	(12.3)	1,162
Burnside	1,230	(90.2)	133	(9.8)	1,363
Geraldine	115	(89.8)	13	(10.2)	128
Hillmorton	2,464	(89.7)	284	(10.3)	2,748
Hornby	1,707	(88.2)	229	(11.8)	1,936
Kaiapoi	616	(86.8)	94	(13.2)	710
Lincoln[a]	1,152	(92.0)	100	(8.0)	1,252
North Canterbury	282	(89.2)	34	(10.8)	316
Northcote	2,126	(90.9)	214	(9.1)	2,340
Rangiora	862	(91.4)	81	(8.6)	943
Timaru	1,311	(86.3)	208	(13.7)	1,519
Woolston	1,974	(83.7)	385	(16.3)	2,359

Note: a Comparator clinic

4.3 Bivariable analysis

Table 4.4 presents the ORs and associated 95% CIs for six explanatory variables considered here. Four of the six variables were statistically significant, including: ethnicity ($p<0.001$), age at appointment ($p<0.001$), socio-economic status by NZdep ($p<0.001$) and clinic location ($p<0.001$). Māori and Pacific Islands pre-schoolers had greater odds of disengagement than their European counterparts 4.3 and 4.8 respectively. Pre-schoolers aged 3-3.9 years had 0.6 greater odds and pre-schoolers aged 4 and over had 0.5 greater odds of failing their scheduled appointment, compared to pre-schoolers aged 0-1.9 years. Pre-schoolers living in high deprivation areas had 5.6 greater odds of failing their scheduled appointment compared to pre-schoolers living in areas of least deprivation. Table 4.4 also shows the OR of failed appointments increased as the level of deprivation increased, suggesting a dose response relationship.

Clinic location also had a significant influence on appointment failure. Table 4.4 shows how the odds of appointment failure were significantly greater for the Aranui and Woolston CDCs, 3.0 and 2.5 respectively.

The two independent variables that did not produce significantly greater odds of disengagement were, pre-schooler sex (p=0.49) and appointment type (p=0.15).

Table 4.4. Odds ratio (OR) and associated 95% CI for failed appointments by characteristics using multi-level mixed-effects logistic regression

	OR	(95% CI)
Sex		
Female	1	(reference)
Male	1.0	(0.8, 1.1)
Ethnicity		
New Zealand European	1	(reference)
Māori*	4.3	(3.6, 5.2)
Pacific Islands*	4.8	(3.7, 6.3)
Asian	0.8	(0.7, 1.1)
Other	1.4	(0.9, 2.3)
Age at appointment (years)		
0-1.9	1	(reference)
2-2.9	0.8	(0.7, 1.0)
3-3.9*	0.6	(0.5, 0.7)
4+*	0.5	(0.5, 0.7)
Deprivation		
1 (least deprived)	1	(reference)
2	1.2	(1.0, 1.6)
3*	2.1	(1.7, 2.7)
4*	3.0	(2.4, 3.8)
5 (most deprived)*	5.6	(4.5, 7.2)
Clinic location		
Lincoln	1	(reference)
Akaroa	0.3	(0.3, 3.3)
Aranui*	3.0	(2.2, 4.2)
Ashburton	1.8	(1.3, 2.6)
Burnside	1.3	(1.0, 2.0)
Geraldine	1.5	(0.7, 3.3)
Hillmorton	1.4	(1.0, 1.9)
Hornby	1.7	(1.2, 2.4)
Kaiapoi	2.1	(1.5, 3.3)
North Canterbury	1.5	(0.9, 2.7)
Northcote	1.2	(0.9, 1.7)
Rangiora	1.1	(0.7, 1.7)
Timaru	2.1	(1.5, 3.0)
Woolston*	2.5	(1.8, 3.5)
Appointment type		
Examination	1	(reference)
Treatment	0.9	(0.8, 1.0)

Note:*p<0.005

4.4 Multivariable analysis

Table 4.5 presents a multivariable model of independent variables that were significant in the bivariable model. These independent variables remained significant in the multivariable model but some modified OR estimates were observed – consistent with potential dependencies and confounding.

Table 4.5. Adjusted odds ratio (OR) and associated 95% CI for failed appointments from multi-level mixed-effects logistic regression

	OR	(95% CI)
Ethnicity		
New Zealand European	1.0	(reference)
Māori*	3.3	(2.8, 4.0)
Pacific Islands*	3.6	(2.7, 4.6)
Asian	0.9	(0.7,1.1)
Other	1.2	(0.8, 2.0)
*Age at appointment (years)**		
0-1.9	1.0	(reference)
2-2.9	0.8	(0.7, 1.0)
3-3.9*	0.5	(0.5, 0.7)
4+*	0.5	(0.5, 0.7)
Deprivation		
1 (least deprived)	1.0	(reference)
2	1.2	(1.0, 1.5)
3*	1.8	(1.4, 2.2)
4*	2.1	(1.7, 2.6)
5 (most deprived)*	3.4	(2.7, 4.3)
Clinic Location		
Lincoln	1.0	(reference)
Akaroa	0.3	(0.3, 2.7)
Aranui*	1.8	(1.3, 2.4)
Ashburton	1.4	(0.9, 2.0)
Burnside	1.2	(0.8, 1.7)
Geraldine	1.7	(0.8, 3.6)
Hillmorton	1.1	(0.8, 1.6)
Hornby	1.3	(1.0, 1.9)
Kaiapoi*	1.8	(1.2, 2.7)
North Canterbury	1.5	(0.9, 2.6)
Northcote	1.0	(0.7, 1.5)
Rangiora	1.1	(0.7, 1.6)
Timaru	1.6	(1.1, 2.2)
Woolston	1.5	(1.1, 2.1)

Note:*p<0.001

Māori and Pacific Islands pre-schoolers remained at greater odds of appointment failure compared to the European reference group, but the odds ratio had reduced. Māori had reduced from 4.3 to 3.3 and Pacific Islands from 4.8 to 3.6. For deprivation, quintile 3 reduced from 2.1 to 1.8, quintile 4 from 3.0 to 2.1 and quintile 5 from 5.6 to 3.4. However, the gradient observed in the bivariable analyses endured when the other variables were included within the regression model.

Pre-schoolers aged 3-3.9 years and 4 and over at the time of their appointment, remained at significantly greater odds of appointment failure in the multivariable model compared to the 0-1.9 year old reference group. The OR reduced for pre-schoolers aged 3-3.9 years reduced from 0.6 to 0.5 and pre-schoolers aged 4 years and over remained consistent at 0.5.

Table 4.5 illustrates how clinic location remains significant in the multivariable model. The Aranui clinic remained significant in both models despite the OR reducing. The OR for Aranui almost halved from 3.0 to 1.8. The Woolston clinic which was significant in the bivariable model did not remain significant in the multivariable model. Moreover, the Kaiapoi CDC became statistically significantly in the multi-variable model. However, the reason for this is likely related to the Canterbury earthquakes, which is outside the scope of this research.

Chapter 5: Qualitative findings; why parents and caregivers with pre-schoolers disengage with the CDS

It is important health services understand patient disengagement and have a process for addressing frequent disengagement (Moursi, 2003). Services that have this in place put themselves in a better position to understand patient and family need, and identify potential disengagement problems before they worsen. At the same time, these services may become aware of the role they play towards patient disengagement.

As explained in the introduction chapter, frequent disengagement from preventative care services reduces the chance of early identification, monitoring and management of possible diseases. When frequent disengagement is not addressed in a timely manner, it is extremely common for diseases to worsen and the patient to require secondary care. Utilising secondary care services can create additional stress for the patient and their family, as well as financial and resource pressures being placed on the health service.

In oral health, patient disengagement literature is limited. The purpose of this chapter is to answer the second research question and provide insight to the limited researched area by presenting the findings from two Christchurch parent and caregiver focus groups. The two focus groups consisted of twelve female participants who had a pre-schooler currently enrolled with the CDS and had experienced at least two failed appointments.

The chapter begins by reflecting on the participant's childhood dental perceptions and experiences, followed by four factors they identified as influencing their

disengagement with the CDS. Lastly, participant recommendations made to the CDS regarding how to increase engagement are described.

5.1 Participant reflection on childhood dentistry

Reflecting on their dental experiences and perceptions as a child, participants described a contrast between their childhood and what their pre-schooler currently experiences. Reasons for this contrast was mostly attributed to the modern dental equipment and improved pain relief that is offered today.

Ten of the twelve participants had a negative perception of their dental nurse as a child, with negative perceptions being centred on physical objects and sensations in the dental setting. Needles and drills are examples of the physical objects that triggered parental uneasiness prior to and during their appointment. These physical objects were associated with pain and as participant eleven explains, the unusual feelings they created in their mouths.

> *"When I was younger I didn't really like the dentist. Just because when I got the needle and then they started drilling, I could still feel it and it put me off." (Participant Nine)*

> *"I hated the dentist, I hated it, I hated it, I hated it at primary school, honestly, I hate fillings….I hate the vibrations of the drill on my teeth… I hate not being able to swallow properly. But now I don't care because I just want to get my teeth fixed and the dentist at [private dental practice name] is good because he does it really fast." (Participant Eleven)*

Smell and noise were also associated with feelings of unease. These sensations activated memories once participants had made their way into the dental clinic.

“I hate the smell… I didn’t like the dentist as a child because of the smell and the noise.” (Participant Ten)

“I didn’t like the smell. The dentist has quite a horrible smell.” (Participant Five)

Participants described how positive perceptions were related to relationships they had formed with their dental nurse and when they only required limited dental work. The two participants who had a positive perception of their dental nurse as a child were older mothers. Both mothers described the relationship formed between themselves and their dental nurse as comforting. One of them described how she felt special when her dental nurse took the time to make her butterflies out of cotton rolls and floss. This act of kindness created a positive perception towards her dental nurse.

“Yeah, going to the dentist, it was pleasant for me. I used to get lots of treats and little butterflies and things and I never had any fillings at school, so I liked going.” (Participant Four)

Participants reported that positive experiences were moderated by the amount of dental work they required. Those requiring minor work were less likely to associate dental appointments with pain and anxiety, and instead with positive feelings.

“I’ve had no problem with the dentist because I’ve never really had to go… As an adult, my teeth are screwed, but as a kid I didn’t get fillings until I was nineteen.” (Participant Six)

“Going to the dentist, it was pleasant for me… I never had any fillings at school so I liked to going.” (Participant Four)

Out of the twelve participants, only participant five and eight mentioned they would be anxious if they had to have a dental check tomorrow. Both participants admitted having a negative perception of their dentist as a child, with participant five's explanation being related to her family history of dental anxiety.

> *"My mother has kind of inflicted a fear of the dentist on to all of her children." (Participant Five)*

Despite her family history and her own dental anxiety, participant five still acknowledged the importance of her children attending dental appointments. Participant five explained how she tries hard to put her own fears aside and tries not to let them be a disengagement barrier for her young children.

> *"I don't want my children to have that same fear inflicted on them so I try not to, just like I'm petrified of things but I'll still take them because I don't want them to have the same, I hate it." (Participant Five)*

Unlike participant five, participant six said she would not be anxious if she had to have a dental check tomorrow. It was important to participant six, that prior to a dental appointment, she explains to her son what the dental therapist will do during the dental appointment, and describes the clinic setting. She believes her preparation before the appointment has helped her son relax and reduce disengagement in the surgery because he is able to understand what is going on.

> *"…..because he got to meet them before he got any work done and they talked to him and told him what was happening and I told him before hand, um that you are going to get needles and this is how it is going to be done, he ended up getting them done without needles in the end." (Participant Six)*

Participants also described how reasons for disengagement can change over time. As a child, eight of the ten participants were more likely to think about avoiding their dental check because of negative perceptions towards their dentist. As an adult, the eight participants said the two main reasons for their dental avoidance were related to the cost of the dental examination and the potential treatment required. Coupled with this was their understanding of the consequences associated with delaying routine check-ups. Three participants believed they would need treatment because they had delayed their routine appointments.

> *"I would feel quite depressed because I don't have the money for it."*
>
> *(Participant Nine)*

> "*I'd be worried because I know what I'd be in for, too much work."*
>
> *(Participant Six)*

After reflection on childhood dental experiences and perceptions, participants did not believe that their past dental experiences or perceptions influenced their pre-schoolers disengagement with the CDS. What participants did identify were four factors they believed influenced pre-schooler disengagement with the CDS. The four factors are waiting room and dental surgery ambience, staff attitude, physical resources that inhibit accessibility and communicating with technology.

5.2 Factors that influence disengagement

Focus group findings show that one or a combination of these factors can be responsible for disengagement. When discussing the factors, participants also kept an open mind and spoke on behalf of parents and caregivers who were not represented in the focus groups. They also described how they had learnt from previous disengagement situations, with some participants sharing how they had

overcome previous disengagement barriers. Participants did not speak of disengagement in a negative context, which is often how it is perceived within health services and wider health disengagement literature.

Participant demographics collected at the beginning of each focus group aimed to discover ethnic, sex and age specific differences in regards to factors influencing disengagement. A cross tabulation table using Dedoose software found that participant's sex or ethnicity had no influence on disengagement perspectives. The reason for this is most probably related to all participants being female and the majority of them identifying as European. A participants age was the only demographic that clearly drew differing perceptions on CDS disengagement. This was most noticeable when discussing the resources that inhibit accessibility and communicating with technology factors.

5.2.1 Waiting room and dental surgery ambience

Waiting room and dental surgery ambience was described as disengagement caused by physical objects in the dental surgery or waiting room that provoked feelings of uneasiness, uncertainty or discomfort. This could affect participants, as well as their pre-schooler.

> *"he [her son] was just freaking out because there was this big, you know, needle going into his mouth, he didn't know what was going on." (Participant One)*

> *"they show pictures of teeth that are bad and not good, same with the tongue and the gums… that just scares kids." (Participant Twelve)*

The physical objects routinely referred to in the dental surgery were the drill and needle, and in the waiting room were the pictures on the walls and toys. Participant six gave an example of the dental needle and explained how it made her son feel anxious. She had learnt to reduce the chance of disengagement (caused by the needle) by prepping her son before the appointment, so he has an idea about what might happen during the dental check-up. By doing this, the ambience in the dental surgery changes and becomes more relaxing, because her son is less anxious about the needle and less likely to disengage. Participant six also explained how her sons disengagement could be overcome when he is given the sunglasses to wear during the appointment, because it prevents his sight of the needle.

> *"He didn't even see the needles because they put the dark shades on now and because they are looking up, mmm." (Participant Six)*

Participant seven and eight also liked how their child had to wear sunglasses and thought they are an effective way to create a "fun" atmosphere in an unfamiliar environment. Both participants recommended the service continues to supply 'funky' glasses because they are an object children can relate to, which can help relax the child.

Participant ten also discussed the unfamiliar dental surgery and gave an example of how the surgery can be overwhelming and lead to disengagement. She explained how her son became overwhelmed in the dental surgery and was unable to be calmed down by the dental therapist. He then became uncooperative and disengaged before the examination could begin.

> *"My son hated. He wouldn't open his mouth or anything." (Participant Ten)*

Participant six had a different view towards her child's disengagement being caused by the ambience in the waiting room and dental surgery. While she understood how parents and caregivers could disengage because of the thought of their child being exposed to the needle and drill, she reflected on her own experiences as a child. She remembers her dental clinic having old equipment and limited pain relief options and despite this, she didn't disengage.

> *"I think you know we are the last generation to refer to it as the murder house and you had to sit in the cranky old chairs and you know, it had that smell, you know, there's none of that now. Yeah it's all up there." (Participant Six)*

This experience meant she was less able to understand how ambience in the CDS creates disengagement, when parents and caregivers have experienced such a large transition in dental surgeries and wait rooms.

Participant twelve discussed the visual aids in the clinics and how they can be unsettling for children. Participant twelve felt clinics that have pictures of unhealthy teeth and gums on the walls will make children unsettled and may make them feel uncomfortable for the rest of the visit.

> *"…. like they show pictures of teeth that are bad and not good, some with the tongue and the gums… that just scares kids." (Participant Twelve)*

Toys in the waiting room were also discussed. Participants in the second focus group were told how the CDS is in the process of removing toys from all clinic waiting rooms because of the risk of spreading diseases. This was met with mixed opinions and four participants openly disagreed with the decision and felt the removal of toys would change the familiar feel in the waiting room.

Participant eight explained how the toys are a great distraction for pre-schoolers. Having the toys available meant the pre-schooler was occupied in the clinic waiting room. She explained how removing the toys would make the service less enjoyable because her pre-schooler would more likely be bored and become a nuisance, something she wanted to avoid.

> *"It is a bit silly because kids need something to be able to distract them and if you have to wait ages, you need something there… yeah they get bored and annoy the heck out of ya." (Participant Eight)*

In response to participant twelve and eight, participant ten thought the service has quite a straight forward job to prevent disengagement. She explained, to reduce uncomfortable feelings in the waiting room and dental surgery, each visit needs to make the child feel at ease. This needs to begin with the child being engaged and interested in the waiting room or dental surgery. In this way, physical objects could potentially have a role in preventing future disengagement.

> *"Well if they made the child more comfortable and everything from the first time then they should look forward to going back again. If they got scared then they obviously don't want to go back." (Participant Ten)*

An object that all participants agreed on to support engagement, were the televisions on the ceiling of every dental surgery. The televisions were described as an effective tool for relaxing and distracting children and without these, many parents felt their child would become less cooperative and disengage with the clinician.

Participant six explained how the television helps her son ‘zone out’. Similar thoughts were expressed by participant eleven who explained how the television is a good distraction tool that can reduce worry.

> *“… they will be focused and like concentrating on the TV, like they are not going to be like worried about what the dentist is doing.” (Participant Eleven)*

Participant five explained how overall, she feels the service is a lot better since introducing television into dental surgeries.

> “*I think the introduction of the TV has helped mine [pre-schooler], because that is the only way he will zone out, he won’t run around if there is something on.” (Participant Six)*

5.2.2 Staff attitude

Participants described staff attitude as, the attitude a clinical or non-clinical CDS staff member had towards themselves or their pre-schooler. Staff attitude could be positive or negative, with negative attitudes more likely to result in disengagement and the consideration of future engagement. Participants described non-clinical staff as staff who work outside the dental clinic. Their example was CDS call centre operators. Clinical staff members were dental therapists or dental assistants who worked in the dental clinic.

Participants believed non-clinical and clinical staff members have a different role towards disengagement and almost described this as a ‘chain effect’. The attitude non-clinical staff members portrayed to participants when booking appointments made participants disengage or contemplate disengagement. Participant one explained that if clinical staff were not understanding and flexible she would

disengage from the CDS. She explained how a non-clinical staff member booked her pre-schooler into the wrong clinic location. Her pre-schooler had been booked into a clinic that was on the other side of town, even though she lived down the road from her preferred clinic. Participant one said if the clinic location was not changed, she would have to disengage because she could not afford to travel to the other clinic.

Participant one explained, these types of situations can be easily rectified by CDS staff. Participants five and seven were in a similar position as participant one and recommended how they were able to re-engage after their disengagement. They felt rebooking was made easy, when the call centre staff are understanding and flexible around appointment times and locations.

> *"...they've been really good. If you can't make it, they are pretty good to reschedule." (Participant Five)*

Participant seven, who had also experienced disengagement, explained that when it came time to book an appointment with the CDS, the call centre staff helped reduce disengagement because they made her feel comfortable on the phone. She did not go into a lot of detail about this comfort, but said she does not like booking her own health appointments, but is happy to book her son's dental appointments.

Participants also described the impact a clinician's attitude can have on re-engagement. This attitude predominately occurs in the dental surgery. Participant one shared her example of a negative clinician who made her son disengage.

> *"I've had one really horrible one with one of my children and she was a grumpy old bat, because my son was freaking out and she got all wound up about it. It's like what kids don't, you know, some kids just do. They should*

know how to deal with that instead of getting grumpy at them." (Participant One)

Participant seven believed that a clinician's attitude goes beyond personality to include their mannerisms. Clinician's whose mannerisms did not fit the participants' perception, made participants rethink how they feel when they engage with the service.

"*I mean they work at the dentist, smile." (Participant Nine)*

"…like show us your nice perfect teeth." (Participant Eleven)

Participant six had a diplomatic view on a clinician's attitude and the influence of disengagement. She felt there was no difference between clinician's attitudes at the CDS and the dental staff she had as a child.

"Yeah, I mean you've still got your old school dental nurses that we probably had as kids that will just not take your shit." (Participant Six)

While she understood that clinical staff may be grumpy after a long day, as a child, she did not disengage when she had a grumpy staff member. Therefore, she would not expect her child to today. She also felt some of the negative perceptions around clinical staff attitude could be reduced by holding parents and caregivers responsible for preparing their child for an appointment. This preparation can change the pre-schoolers attitude, for example, reduce their anxiety, making them more cooperative for the clinician and a more enjoyable experience overall.

"If you go in with an attitude for the kid, it reduces their stress level…When my son goes to the dentist I want to relax him so he feels comfortable getting the work done." (Participant Six)

5.2.3 Physical resources that inhibit accessibility

Participants described physical resources as physical objects that could create or prevent disengagement with the CDS. Most of their answers described these objects as revolving around private transport options, with limited discussion surrounding the use of public transport or accessibility to finance for public transport use. Physical accessibility also included participant's knowledge on clinic location and service hours.

Lack of transport was a significant contributor towards disengagement. Five of the twelve participants specifically mentioned transport as a barrier, but all twelve agreed that transport was a significant barrier once discussion began. Two prominent issues with transport were car ownership and not holding a drivers licence.

"I'd say transport is my biggest thing because I don't drive." (Participant Three)

Participants then explained how they need support to address their transport barriers. Participant ten explained how asking family and friends for transport to an appointment may reduce disengagement, but quickly refuted this once she realised the appointment times clash with their hours of work. She then took into account parents and caregivers who have no support system and are unable to take time off work.

"Yeah so, they're not going to be available to take their children to the dentist during those times and there might not be another adult or someone else around to take them." (Participant Ten)

Participant ten discussed how disengagement could be reduced by using public transport, but went on to explain how public transport is unreliable and costly. Participant ten recommended disengagement due to transport could be reduced if the service could provide home visits. This idea was quickly retracted, once she thought about the logistics of home visits.

"Would home visits work though? Because they have got lights at the top, and then they bring them down, and then the x-rays, would that really work?" (Participant Nine)

Participant nine was confused after participant ten told her that the CDS have mobile vans that go to primary and intermediate schools but not pre-schools. She recommended that the service explore this option.

"Oh actual… well I didn't know that. Well then yeah, that would work." (Participant Nine)

Participant one considered how other service users may not be able visit a clinic during normal opening hours. For her, the hours are less of a problem because she is a full time stay at home parent with more flexibility to visit the clinic during service hours. However, she felt the hours are restrictive for working parents and understood how in these situations, they would have few options and may disengage.

"So if I was a working parent, my kids would have to go without because I couldn't be there….. It's only open school hours isn't it? So if you are a working parent, you are screwed." (Participant One)

Participant six's suggestion on how to reduce disengagement for working and non-working families would be opening the service in the weekend. Weekend hours would be more flexible for family work schedules and private transport arrangements.

"I would have it open Saturday morning for some of those parents, or even Sunday morning because of sport on Saturday." (Participant Six)

Participant one agreed and suggested late night appointments. Participant ten also expressed how late opening hours would suit her lifestyle better.

"Yeah they need to be open till later because, for people like us, we go to school…." (Participant Ten)

Clinic location was another barrier that contributed to disengagement. Participant one referred back to her situation about non-clinical staff booking her pre-schooler into the wrong clinic. If there was no capacity to change her appointment to her preferred clinic, she explained how her child would have to miss out.

"I cannot afford to get to the [clinic name], I need to go to the [clinic name] or my children miss out." (Participant One)

Participant seven understood participant one's frustration. While participant seven was happy with her clinic location, she said she would find it difficult going to an appointment if she did not know the clinic location.

Participant eight agreed with participant seven, but had developed a strategy to prevent future disengagement. Participant eight uses Google maps to make sure she knows the clinic location. However, even with this strategy, participant eight explained how she still managed to get lost. At one appointment, she thought she had planned enough time in advance, but when she arrived at the school where the clinic was located, she was at the wrong entrance.

> *"When I went to the [clinic name], we went around the front of the [school name] and then we were like you dork, it is around the back." (Participant Eight)*

Participant seven and eight agreed more instructions from the call centre would help prevent this in the future.

The difference in participant age was noticed when discussing accessibility to clinic location. Participant four and six, two older participants, referred frequently to the old school dental service model of care. Although participant six liked the new model of care, she still felt the old model of care was easier to engage with. She believed having dental clinics on all primary school grounds reduced the physical distance parents and caregivers had to travel to engage with the service and also felt a better relationship was formed between parents and clinical staff. Participant one agreed with participant six's point about the location of dental clinics under the old model of care.

> *"Yeah well if I didn't drive it would take me probably half an hour, if not longer to walk to the dentist and if it was still in the schools, based in the schools like it used to be, it won't be so much of a hassle." (Participant One)*

Ironically though, the two older participants were also the two participants that were most excited about the transition of dentistry, modern equipment and improved pain relief. This may suggest that despite the participants being in favour of their pre-schooler being able to experience the transition of dentistry, it is still clinic location that influences disengagement.

5.2.4 Communicating with technology

Participants described communicating with technology as the style of communication between CDS staff and parents and caregivers, which involved technology to book or reschedule appointments. The two methods of communication commonly referred to were, land line and cell phone text messaging. No participants mentioned the services e-mail address.

All participants were impressed with the services use of text message reminders and felt it complemented their busy lifestyles well. Participant three explained how this style of communication had prevented her from service disengagement.

> *"I've had it real good, they actually text you, like tell you you're due for a check-up or something and I think that is fantastic because I would never remember otherwise". (Participant Three)*

Communication via text messaging was believed to prevent disengagement because of its ease of use, and the ability to receive an appointment reminder no matter where the participant was. Participant four was impressed at how quickly the service sent out an appointment reminder for her daughter. Her daughter had recently turned two years of age and even though she could not remember how the service got her

number, she was happy the service made contact. If she had not received the reminder, she admitted her daughter would not have been booked so promptly.

> *"Yeah, my daughter turned two last, on Saturday and she has her first appointment tomorrow….Yeah they contacted me last week and yeah, they were quite on the ball with her. So hopefully her teeth are good. I don't know [laugh]." (Participant Four)*

Younger participants agreed with the service's use of technology to communicate with parents and caregivers. However, unlike the older parents, the younger parents discussed disengagement barriers that can be experienced when using technology as a form of communication.

The younger participants did not like how the service's out bound calls appear as unknown on their cell phone screen. Participants seven, eight and ten explained how they do not answer calls from unknown callers, because they do not know who is trying to contact them.

CDS staff are also not allowed to leave informative voice messages on home phones and some cell phones for privacy reasons. However, this may have little influence on call back frequency because, as participant seven and eight explained, leaving voice messages on cell phones is not effective because people often do not have enough money to listen to voice messages.

> *"I do every now and then [listen to voice messages]." (Participant Eight)*

> *"I need credit for that [in order to listen to voice messages]." (Participant Nine)*

All participants praised the service's 0800 number because it is free of charge and they can call the number from land lines and cell phones. Participant two liked that the 0800 number was free, but explained how it does not help her engage because she always misplaces the number. She felt the service could create fridge magnets for parents and caregivers so that the 0800 number would not get misplaced. She explained how other services offer fridge magnets with their contact details.

5.3 Participant recommendations

Based on their experience with the CDS, participants provided a number of recommendations which they believed the CDS could implement to reduce future disengagement.

Participants felt there was a need to enhance the clinic environment. Their recommendation was to introduce more colourful child-relatable pictures on the walls, in waiting rooms and dental surgeries.

> *"Ah just make it interesting for the child, because every child has different interests and is different." (Participant Ten)*

> *"Pictures on the wall, of like kids' stuff." (Participant Nine)*

The majority of participants also believed toys should remain in the waiting room. The availability of toys were considered a means for entertaining pre-schoolers, and relaxing both the pre-schooler and participant before entering the dental surgery.

> *"Well it's not very nice [removing the toys]." (Participant Seven)*

> *"It's a bit silly, because kids need something to be able to distract them and if you have to wait ages, you need something there." (Participant Eight)*

Another recommendation was the distribution of fridge magnets containing the services contact details. The fridge magnets provided a simple means of finding the services contact details when required.

> *"Um, I know I was just thinking, um they do have the 0800 number but they could make like magnets for it or something. There are lots of magnets for other agencies but not for the dental service. Sometimes, I'm like oh where do you find that number." (Participant Two)*

Another recommendation was improving the attitude of clinical staff. Younger participants expressed how they felt uncomfortable because of clinical staff's facial expressions. Participants also stressed the importance of establishing a good rapport at the first appointment, and believed this is critical to maintaining future engagement.

> *"Some of the staff actually need to smile…some of them like look really grumpy." (Participant Seven)*

> *"I mean they work at the dentist, smile." (Participant Nine)*

> *"Well, if they made the child more comfortable and everything from the first time then they should look forward to going back again….If they got scared, then they obviously don't want to go back." (Participant Ten)*

Recommendations were also made referring to the services clinic hours and service model. Participants felt weekend or late night appointments would cause less conflict with their personal and family schedules.

"I would have it open Saturday morning for some of the parents, or even Sunday morning because of sport on Saturday." (Participant Six)

"Or a late night. I mean it's no biggie for me because I don't work, but thinking of some of the working parents, it just wouldn't really work, it must be hard." (Participant One)

"Yeah, they need to be open till later because for people like us, we go to school." (Participant Ten)

Younger participants (16-19 years of age) recommended that the service uses its mobile dental vans to screen pre-school children. These participants attend alternative education during the day and believe a mobile service would be helpful and save them time because they would not need to attend a clinic appointment.

"They could have like a special van that has all the equipment in it." (Participant Eleven)

"Yeah, like the school ones, they've got trucks that go around." (Participant Ten)

"I didn't know that, well then yeah [having a mobile van for pre-schoolers]." (Participant Nine)

Chapter 6: Discussion

This chapter discusses quantitative pre-schooler appointment failure findings with the qualitative findings from the two parent and caregiver focus groups. These findings are compared to the available national oral health research, and the international health and oral health service disengagement literature. The study's strengths and weaknesses are then discussed, followed by research recommendations and concluding thoughts.

This type of study is the first to be undertaken by the CDHB CDS and, as far as we are aware, by any other publicly funded dental service in New Zealand. The unique aspect of this research was the use of a mixed methods approach that integrated the findings from electronically recorded data and focus group discussions. The overall findings were used to answer two research questions: identify the characteristics and location of pre-schooler appointment failure with the CDS between 2010 and 2014; and ask pre-school parents and caregivers to identify factors causing appointment failure and their recommendations to improve service engagement.

6.1 Primary findings

The most important finding identified through the quantitative analysis is that 12.3% of the18,933 scheduled appointments ended in appointment failure. Of the total number of scheduled examination appointments, 12.1% resulted in appointment failure. Similarly, 13.2% of the 3,530 scheduled treatment appointments ended in failure. The minimal difference in the percentage of failed appointments by appointment type, revealed that pre-schoolers are not at greater risk of failing an appointment based on appointment type.

This study demonstrated significant relationships between failed dental appointments and pre-schooler characteristics. Māori and Pacific Islands pre-schoolers, pre-schoolers living in moderate to high deprivation areas, and pre-schoolers aged 3 or 4 years at the time of their appointment, were at greater odds of failing their scheduled appointment compared to all other pre-schoolers.

These findings are consistent with national reports by the Ministry of Social Development (MSD) and the MoH (Ministry of Health, 2000, 2010; Ministry of Social Development, 2012). The MSD identified children with these characteristics as being vulnerable and requiring additional support to improve their health and wellbeing (Ministry of Social Development, 2012).In the oral health secondary care sector, pre-schoolers with these characteristics have been identified as more likely to access secondary care services (Whyman et al., 2012). Similar trends have also been documented internationally (Chrisopoulos & Harford, 2012; Ha, Amarasena, & Crocombe, 2013; Parker et al., 2012). In Australia, two different studies concluded, young children with an Aboriginal background are more likely to experience poor oral health status and accessibility issues compared to non-aboriginal children (Chrisopoulos & Harford, 2012; Parker et al., 2012). Moreover, Ha et al. (2013) found young children, children living in high deprivation areas and children with an ethnic background in Australia, are at greater risk of poor oral health outcomes and accessibility issues. Similarly, in Canada, young children living in high deprivation areas and children with no access to health insurance were more likely to be disengaged with oral health preventative care services (Rowan-Legg, 2013).

Focus group participants identified four factors which they believed influenced disengagement, namely; waiting room and clinic ambience, staff attitude, physical resources that inhibit accessibility and communicating with technology.

Appointment failure represents more than a binary outcome (completion or failure), and needs to include the social, economic and cultural circumstances of a pre-schooler. Furthermore, these four factors also influenced appointment failure at different stages during the appointment journey. For example, resources that inhibit accessibility and communication with technology influence the parent's or caregiver's ability to organise an appointment and arrange transport. Waiting room and clinic ambience, and staff attitude influence the pre-schoolers physical behaviour after arrival, which can cause disengagement during a dental consultation.

While Phase one findings shared similarities with national and international literature, the four factors identified by focus group participants as influencing disengagement are not identified in the national literature – perhaps due to the paucity of qualitative research. However, the four factors are recognised as influencing disengagement in the international literature.

Limited private transport options, no driver's licence and unsuitable clinic hours resulted in participants being unable to attend their scheduled appointment. While participants were proactive and discussed solutions for preventing disengagement in the future, it was the one factor that participants had limited control over. Participants found using friends or family for transport is not necessarily reliable, especially when the appointment is not a priority for the friend or family member. Alternative public transport options were considered, but less favoured as they were associated with additional costs.

Canvin et al. (2007) studied families living in adverse conditions and their perception towards public services. The study found the management of public transport and timetables can lead to disengagement. Williams and Gelbier (1998) asked participants for their suggestion on how to reduce disengagement. Participants suggested that there is a need for dental services to be located close to their homes, on bus routes or combined with other health services.

Participants in Scheppers, van Dongen, Dekker, Geertzen, and Dekker's (2006) research, who identified with an ethnic minority, mentioned irregular public transport and the location of services as disengagement barriers. Furthermore, participants also explained that appointment times need to be convenient (Scheppers et al., 2006).

Participants unanimously agreed that clinic hours were a barrier. Younger participants explained how they struggled to book appointments with the CDS at convenient times. Participants expressed their awareness of other parents and caregivers, and their differing needs of the CDS. Participants wanted to know how parents and caregivers who work full time or shift work are expected to attend an appointment during the service's open hours. They understood how parents and caregivers in these situations sometimes have no choice but to fail the appointment.

Higgins, Duxbury, and Lyons (2008) studied the work environment and the influence it can have on personal priorities, which provides some rational behind the focus group participants perspectives. Higgins et al. (2008) discusses the term Work-to-Family interference and uses the term to explain how employee work demand and responsibilities "make it more difficult to fulfil family-role responsibilities" (Higgins et al., 2008, p. 9). Furthermore, the report discusses how employers need to

understand the family responsibilities of their employees. Employers should display flexibility towards employee needs and support employee work-life balance (Higgins et al., 2008).

The CDS should acknowledge the work life balance for some service users, and consider how they could have flexible service hours to support families to attend an appointment. This flexibility is a component of patient centred care, which can be powerful for families, and as Mitchell (2014) and British Columbia (2011) found, are favourable, as patient centred care provides service users with a sense of self-managed ownership of their health care.

The services use of technology to communicate with parents and caregivers could be utilised more effectively. In particular, younger participants explained how the services outbound number appearing as ‘unknown’ when calling mobile phones is not helpful. Furthermore, they explained that it is common for people to ignore ‘unknown’ numbers, as well as voice messages which cost money to check.

Communication with technology was least explored in the oral health sector, but of the related research, showed promising results. Shmarak (1971) found, when sending appointment reminders to patients, receptionists who contacted patients by phone reduced the chance of disengagement compared to appointment reminders being sent by postal mail. More recently, Schluter et al.’s (2015) study concluded that text message reminders were an important form of communication and found the wording of text messages were just as important. Text message reminders that were encouraging and positive had a greater chance of keeping participants engaged compared to text messages that were long, used slang and were less encouraging.

Waiting room and dental surgery ambience, and staff attitude, showed how disengagement can occur after the pre-schooler arrives at their appointment. Participants spoke about how disengagement can occur in the clinic waiting room and dental surgery. Visual aids in the clinic waiting room and the availability of toys changed how relaxed the pre-schooler felt, as perceived by the participant. The dental surgery was no different. The visibility of the drill and needle was explained by participants as creating pre-schooler uneasiness, which has been known to result in the pre-schooler physically withdrawing from clinical staff, thereby effecting the current appointment and influencing ongoing engagement.

Williams and Gelbier (1998) explains the role of clinic ambience and how dental practices must be comfortable and welcoming. Williams and Gelbier (1998) agree with current participants that toys should be made available in the waiting room to reduce anxiety and hesitation. Scheppers et al. (2006) found ambience can change when the patient views a procedure to be intrusive, making them fearful or frightened, which can become an ongoing barrier. Participants in research by Moore et al. (2004) and Armfield et al. (2007) openly admitted that that they would disengage or put treatment off due to the awareness of feelings that are developed in the dental clinic, often in relation to the dentist's drill or needle.

How clinical staff dealt with these situations is important. Participants explained, staff who are understanding and flexible to the pre-schoolers needs have a better chance of rectifying the withdrawn behaviour. Canvin et al. (2007) found, a staff member's role is vital for service engagement and re-engagement. The study showed participants were concerned about staff misunderstanding their needs and having preconceived judgement. Furthermore, Canvin et al. (2007) found, when staff

members act in an insensitive manner, it is not uncommon for the participants to avoid the service or only use the service as a last resort. Findings from Canvin et al.'s (2007) research are consistent with the current findings from participants that show staff attitude at the first appointment can have a bearing on whether a participant does or does not engage.

Staff attitude has a significant influence on ethnic minorities and health service engagement. Williams and Gelbier (1998) explained how staff attitude played an important role in maintaining service engagement for ethnic minorities, with participants feeling it was important that dentists had the ability to understand them and reduce communication barriers.

Robson et al. (2011) reviewed literature on indigenous oral health in New Zealand. Robson et al. (2011) found that for indigenous oral health services, there was "a lack of trained professionals" and a disjoint between preventative care, primary care and secondary care systems (Robson et al., 2011, p. 134). The influence staff attitude has on ethnic minorities can be unfavourable. Robson et al.'s (2011) stakeholder focus groups found, "the ability to be able to communicate with oral health practitioners helps grow a trusting relationship and good rapport" (Robson et al., 2011, p. 45), which is believed to help support service accessibility.

Outside the clinical setting, non-clinical staff can also affect service engagement. Participants explained when receptionists spoke rudely or disrespectful to them, it discouraged the participant from attending the appointment. Ludeke et al.'s (2012) research also discussed the role of the receptionist when caring for Pacific Islands families. Ludeke et al. (2012) explained how patients and family members often view receptionists as the 'front door' to a service and it can be the initial visit that

determines whether engagement will continue. Ludeke et al. (2012) explained that front line staff who are understanding and culturally aware are more likely to create patient engagement.

While the current focus group participants did not involve an ethnically diverse sample, Ludeke et al. (2012), and Williams and Gelbier's (1998) findings still need to be considered, and could help explain Phase one findings which confirmed appointment failure by ethnicity is a problem for the CDS.

Waiting room and clinic ambience, and staff attitude, may help explain why appointment failure has an age relationship, with the observed frequency of failed appointments for children aged 3 and 4 years, greater than that for those aged 2 years. Participants explained how staff attitude and, waiting room and clinic ambiance can affect ongoing service engagement after the first appointment. Participants also placed emphasis on the first appointment, because participants believed this appointment to be pivotal, as it introduces the pre-schooler, parents and caregivers to the service. This belief can be tied back to research by Nash (2009) and Partrick et al. (2006), who discussed one important role of the dental nurse, which was to improve the patient-parent-provider relationship. Participants in Canvin et al.'s (2007) research found poor staff behaviour at the first appointment does influence the likelihood of ongoing engagement.

Although appointment failure increased with age, findings from Phase one also found that pre-schoolers were not at greater odds of failing an appointment due to appointment type. This suggests that appointment failure after the first appointment maybe more closely related to barriers that prevent parents and caregivers getting their pre-schooler to the clinic.

The focus group findings provide greater insight into how the four factors identified by participants influence disengagement, and may explain the frequency of appointment failure identified in Phase one. With the focus group research design providing rich authentic data, and no new themes emerging from current participants over the two focus groups, it can be said that the current findings can lead to hypotheses that can be tested in other oral health context.

6.2 Secondary finding

Findings from Phase one confirmed there is a significant relationship between appointment failure and clinic location. Throughout the research period, clinic location remained at significantly greater odds of appointment failure after adjusting for NZDep. However, drawing conclusions about clinic location need to the treated with caution. Reasons for caution are, CDC's differ in surgery size, CDC disruption caused by the 2010 and 2011 Canterbury earthquakes differed between CDC's, and substantial relocation of Canterbury Residents during the earthquake periods. These reasons have led to clinic location being treated as a secondary finding. However, further analysis on this variable in the future would help discover whether clinic location remains at significantly greater odds of appointment failure irrespective of the earthquake periods.

6.3 Unexpected findings

Two unexpected findings were uncovered. The first was that participants did not believe their childhood dental perceptions and experiences influenced their pre-schoolers current disengagement with the CDS. This finding differs from a number of health and sociology research which concludes that there is a relationship between a

parent or caregiver's oral health habits and the child's oral health habits (Bukatko, 2008; Listl, 2012; Yi-Ling et al., 2013).

The second unexpected finding was the perception participants had when discussing disengagement. Participants had little emotion attached to the term disengagement. All participants appeared comfortable discussing disengagement and spoke about it with little negative connotation. The normalisation of the term disengagement maybe the result of participant disengagement with other health and social services. This finding differed from the negative perception the term often receives from health services and health disengagement literature (Mbada et al., 2013; Moore et al., 2001).

6.4 Strengths and weaknesses

6.4.1 Strengths

The quantitative component of the study utilised a large contemporary database of routinely collected information prospectively captured by the CDS's electronic database, Titanium. The database contained a complete and comprehensive appointment and patient dataset, which was compiled of a diverse ethnic and socio-economic cohort that covered a large geographic area. Recording patient information electronically allows the CDS to capture the exact moment in time, when a change is made to individual patient files. Having the NHI in the source data meant patients were correctly identified and tracked throughout the research period. Moreover, apposite and contemporary biostatistical techniques were applied in the analysis of these data. Because of this, the quantitative findings are likely to be accurate, valid and representative of the population under investigation.

The quantitative research provided the statistical information needed to locate participants for the qualitative research. The ability to identify clinics with high appointment failure provided the geographical locations where the ideal participants may live. Consultation with education providers in these geographic locations increased the opportunity of recruiting participants who had experienced appointment failure. The advantages of consulting with education providers, was the initiation of a discussion around the research topic, the significance of the research and whether staff at the education provider felt there was a need to invite parents and caregivers from their centre to participate. Establishing a good relationship with education providers meant they were willing to distribute research information, on behalf of the researcher, to parents and caregivers. With all the information at hand, the parents and caregivers could choose to volunteer on their own accord. Involving voluntary parents and caregivers who had experienced disengagement meant their answers would reflect their lived experiences and attitudes towards CDS disengagement, therefore creating rich and authentic data. The informal recruitment approach and adherence to ethical requirements would mean enthusiastic parents and caregivers would volunteer, and hopefully their comfort and acceptance would lead to frank and free answers.

The opportunity to consult with the UC Māori health and wellbeing lecturer assured that the research objective, focus group questions and supporting field work documents were at an appropriate literacy level and were culturally sensitive. The advantage of this consultation meant focus group questioning would not undermine or discourage participants and would therefore not compromise the legitimacy of the answers provided.

6.4.2 Weaknesses

This study is not without some limitations. One of the major limitations is in relation to data entry and variable specification and collection. The large number of staff employed by the CDS means that standardising data entry is difficult. In the current research for example, appointment reschedule, cancellation reason and appointment category variables had to be made redundant due to data being inconsistently entered into the database. If data entry was more consistent, the inclusion of these variables would have provided this study with further data for statistical analysis. The limited number of variables collected also created limitations which prevented the opportunity to draw 'holistic' analytical conclusions which could be used to support participant findings.

Data transfer between different databases is another area where data integrity may be compromised, particularly when the source data has been entered incorrectly. Ethnicity is an example of how data entry and subsequent transfer of data are poorly managed by administrative systems. Ethnicity data for a new born child is entered into the DHB's Patient Information Management System (PIMS). This occurs during a restless period when new parents are required to inform staff of the many details about their new born child. Poorly captured data at this stage will then be transferred to the CDS database, Titanium. After the ethnicity data has been transferred, the database is unlikely to be updated by the CDS because there is no ethnicity question on the existing enrolment form. Instead, the CDS relies on the parent or caregivers to initiate a change if the existing details are incorrect. With no system in place to readily update details such as ethnicity, this demographic may be poorly represented in the quantitative findings. These problems are a weakness that is shared amongst a number of health agencies, when patient details are poorly recorded in

administrative databases, and no standardisation between services or across DHB's can make reporting questionable.

Misreporting of data is again evident when geocoding addresses. It is most difficult to capture the current address of pre-schoolers that reside in areas of high deprivation, as a result of their transient behaviour. Any addresses that could not be geocoded were set to missing. While the multi-level mixed effects models account for missing data, the odds ratios produced may have been greater if all pre-schoolers living in high deprivation areas had geo-coded addresses.

An unexpected, but notable weakness was the disruptive earthquake activity during the study period which may have influenced appointment failure. However, the impact the earthquakes have had on the current research is not part of the research plan, meaning no investigation has been undertaken as to how the earthquakes affected appointment failure, with the impact possibly unanswerable.

Another weakness of the study was the definition of disengagement, which differs between countries and services. The CDS defines appointment failure as a patient who does not turn up or gives no advance warning within 15 minutes of the appointment. Other health services, including the NHS and the United States, have unique definitions of disengagement that are not directly comparable to the CDS definition. These variations make comparisons to other populations problematic. Therefore a weakness of this study is that current findings may only be confined to the Canterbury and South Canterbury regions and possibly limit their geographical comparability.

While the focus groups did extract rich and authentic data, some limitations were identified. Using a purposeful sample of parents or caregivers who have a pre-

schooler enrolled in the CDS and had missed a minimum of two scheduled appointments, meant parents and caregivers who are not enrolled with the service were excluded from qualitative research. This criteria means the four factors identified by participants as influencing disengagement only reflect the views of current participants. Empirical generalisations from participant's findings cannot be made to other parents and caregivers who are or are not enrolled with the CDS or other publicly funded dental services.

Ethnicity and sex were not accurately represented in focus groups either. Having no cultural representation in the focus group meant no cultural specific recommendations were made to the CDS. Greater ethnic diversity of focus group participants may have uncovered patterns similar to the quantitative findings that revealed a relationship between disengagement and pre-schooler ethnicity. The abundance of female participants also meant that both sexes were not represented. However, there is an assumption in western society that women are more likely to be responsible for organising healthcare appointments and therefore in the current research, this may not be a limiting factor (Poduval & Poduval, 2009; Wyn, Ojeda, Ranji, & Salganicoff, 2003).

6.5 Recommendations from the study

On the basis of this study, and the evidence base found in the literature, recommendations for the future include further research and service development (consistent definitions and accurate data recording).

6.5.1 Further research

Options for further research should involve repeating the quantitative analysis annually and following up on the current cohort. Annual research will uncover trends and can be used as a way to record changes and monitor progress within the service. It would be highly valuable to follow up on the current cohort and identify future service engagement patterns beyond the earthquake periods. It would also be beneficial to look beyond engagement and link appointment failure, with early childhood caries and referrals made to the Hospital Dental Service (HDS). Greater focus on investigating the complexities and characteristics behind appointment failure are key areas to understanding the reasons for disengagement. Conducting research that actively involves vulnerable service users (for example, Māori and Pacific Islands and low socio-economic families) can move beyond identifying characteristics to understanding what appointment failure means for these populations. Coupled with this can be the need to explore the incorporation of Māori health models, researchers and evaluation strategies to better understand cultural perspectives.

6.5.2 Service development

Consistent definition

A consistent definition of disengagement needs to be established and used by all publicly funded oral health services before regional and longitudinal patient disengagement comparisons can be made. Consistent definitions and data recording across DHB's would allow initiatives to be compared and evaluated. Initiatives that are proven to be successful, could then be applied in other DHB's. Consistent DNA

definitions would ensure concordance of the database variables across various dental and health databases, thus enriching the available information nationally.

Data recording

There is the need to review the accuracy of data recording in Titanium, and the ability to capture other pertinent variables (for example, appointment reschedule, cancellation reason and appointment category). Improved data accuracy will reduce the number of variables that need to be made redundant in datasets, resulting in a greater number of patients being included. For minority groups, this may create more representation. The inclusion of pertinent variables will allow the service to record more data, with greater detail and enable researchers to provide a greater depth of analysis.

6.6 Conclusion

This study investigated how pre-schooler characteristics and clinic location are related to appointment failure with the CDHB's CDS over a four year period. It also explored service user reasons for disengagement and their recommendations on how the service can increase engagement.

The results showed that throughout the research period, there is a significant relationship between experiencing greater odds of appointment failure, and pre-schooler characteristics and clinic location. Pre-schoolers who were Māori or Pacific Islands, residing in areas of high deprivation, and aged 3 or 4, were at greater odds of appointment failure.

Furthermore, the qualitative findings highlighted that appointment failure is not a seemingly simple problem and is the result of complex issues occurring in the individual's lifestyle. Four factors believed to be influencing disengagement are, waiting room and dental surgery ambience, staff attitude, resources that inhibit accessibility and communicating with technology. Participant recommendations made to the service on how to reduce disengagement in the future were variable, some being straightforward to implement, while others would require more resources, funding and approval from DHB management. Current findings are consistent with national and international research.

This is the first time the CDS has explored this research area, and as far as the service is aware, no other DHB's have undertaken similar research. The current findings reinforce the fact that oral health inequalities remain and that appointment failure is continuing to marginalise already at risk groups. This can have detrimental consequences for the Canterbury and South Canterbury population.

To address the issue, current recommendations made to the CDS by participants should be considered in the services delivery of care planning and development. Further research investigating this topic is recommended. Annual follow up on the current cohort will identify future service engagement patterns beyond the earthquake period and the frequency of referrals to the HDS. Additional research must also involve service users, with the focus on at risk populations, as these are the people experiencing the problem. This involvement can uncover authentic experiences and realistic strategies for change. It is this type of research that will improve the oral health status of Canterbury and South Canterbury pre-schoolers.

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8: Appendices

Appendix one: *Personal communication- NZDep based on the 2013 census data*

Thu 4/06/2015 10:25 p.m.

Philip Schluter <philip.schluter@canterbury.ac.nz>

Re: NZDep based on the 2013 census data

To Clare Salmond

Cc Peter Crampton; June Atkinson; Belinda Smith

You forwarded this message on 5/06/2015 8:28 a.m..

On 4/06/2015, at 9:35 pm, Clare Salmond <clare.salmond@xtra.co.nz> wrote:

Dear Philip

The NZDep2013 index is well-validated as an instrument to measure relative small-area deprivation, and that is documented in our online report.

When creating NZDep2013 we used census data, so the information is at a single point in time. Every small area has its deprivation measured relative to the rest of the country at that time. We have no knowledge, as far as NZDep is concerned, about the changing nature of Christchurch (or anywhere else) and thus the possibility that the index of deprivation as at census time 2013 is out of step with any changing deprivation-face of Christchurch (or anywhere else) in other years. So the validity of NZDep2013 for Christchurch when statistically compared to other Christchurch 2013 data (such as health indicators) is fine, but when compared to data gathered in Christchurch in, say, 2015, NZDep2013 **may** not be a very accurate indicator of relative small-area deprivation in 2015 (for example, if the housing stock changed dramatically and the people remaining there, or newly there, were collectively very different from the group of former residents).

My suggestion would be for your student to think of the NZDep2013 measure of relative deprivation as being possibly measured with error when associations with non-2013 data are being considered. This would be true of anywhere else on the country too, but their 'errors' may be smaller. To address this problem in Christchurch, your student may be able to find some additional data to add to any model, such as binary indicators of red-zones or other city-council data.

I hope this helps.

Best wishes

Clare

Appendix two: *Focus group questions*

Focus Group questions

Parents and caregivers have busy lifestyles which can make it difficult to attend dental appointments. The questions below have been developed to better understand parent and/or caregiver engagement behaviour and discover how their pre-schoolers dental service can change to better meet their needs.

1. **Opening question:** Briefly introduce yourself and explain as a child what your thoughts were on going to attending the dental clinic

2. **Introduction question:** If you had to go to the dentist tomorrow for a check-up, how would you feel about it?

3. **Transition question:** What are your expectations of the children's Community Dental Service?

4. **Transition question:** What was the experience like when you visited the Community Dental Service?

5. **Key question:** Please share with the group something that made it difficult for you to visit the Community Dental Service

6. **Key question:** If an appointment was missed, what made it easy to book another visit?

7. **Key question:** What changes could be made that would help parents and/or caregivers visit the dental service?

8. **Ending question:** Is there anything you think I have missed or would like to add?

Appendix three: *Parent and caregiver demographic sheet*

Canterbury District Health Board
Te Poari Hauora ō Waitaha

Participant demographic sheet

Please fill out the details below.

Focus Group: (please circle)

First second

Age: (please circle)

16-20 21-25 26-30 31-35 36-40 40 +

Ethnicity: (you may circle more than one)

European Māori Pacific Island Asian Other

Appendix four: *Parent and caregiver information sheet*

School of Health Sciences

University of Canterbury

Telephone: 03-335 4230

Email: Belinda.smith@cdhb.health.nz

UNIVERSITY OF CANTERBURY

Child Oral Health- Improving Dental Attendance for 2-4 year olds in Canterbury and South Canterbury.

Information Sheet for parents and/or caregivers with a pre-schooler.

Hi, I'm Belinda Smith. I work for the Community Dental Service (CDS) and study part time at the University of Canterbury (UC). My research is looking into dental attendance. I am hoping you will participate in this research and teach me about how the dental service can make dental visits easier.

The research is informal and will involve answering 8 questions with a small of parents and/or caregivers who also have pre-school children. This will take approximately 1 hour. Your answers will be voice recorded so I can replay them for accuracy and data analysis. You may review your answers after the focus group and have one week to make changes.

The research is voluntary and you have the right to withdraw at any time without penalty. If you wish to withdraw I will remove information relating to you, however, this will not be possible after data analysis. Tea, coffee, snacks and Oral Health Kits will be provided, as well as, the chance to win a grocery hamper.

The study is low risk and requires no further information from you. A copy of the results will be available in January 2016, if you would like a copy please contact me. Your identity will be kept anonymous. Any presentations about the research will also keep your identity anonymous. If you have concerns about your family's oral health, with your permission, I can pass your concern on to the nearest community clinic for follow up.

Confidentiality is important to the university so data will be stored on a University of Canterbury computer. Voice recorded data will be destroyed once the thesis has been marked and transcribed data five years after that. University computers are password protected with adequate security. Only my supervisors and I can access the data.

By completing this research I will gain a Masters in Health Sciences. I am under the supervision of Philip Schluter, Philip.schluter@canterbury.ac.nz, Jeff Foote 03-351 6019 and Dr Martin Lee, martin.lee@cdhb.health.nz. They are happy to discuss any concerns you may have.

This research has been reviewed and approved by the University of Canterbury Human Ethics Committee, and participants should address any complaints to the Chair, Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz).

If you agree to participate in the research, you are asked to sign the consent form and bring it along to the focus group.

I very much appreciate your time,

Belinda Smith.

Appendix five: *Parent and caregiver consent form*

School of Health Sciences
University of Canterbury
Telephone: 03-335 4230
Email: Belinda.smith@cdhb.health.nz

UNIVERSITY OF CANTERBURY

Child Oral Health- Improving Dental Attendance for 2-4 year olds in Canterbury and South Canterbury

Consent Form for parents and/or caregivers with a pre-schooler.

I have been given a full explanation of the study and an information sheet to take home. I have had the opportunity to ask questions which were answered to a good standard.

I understand what my role is if I agree to take part in the research. I understand that participation is voluntary, my answers will be voice recorded and I may withdraw at any time without penalty. If I withdraw after data analysis I understand it may not be possible to remove all information I have given.

I understand that any information or opinions I provide will be kept confidential to the researcher and the supervisors supporting the research. I understand I will not be identified in any published or reported results and neither will the Education Centre I belong to. I understand that a thesis is a public document and will be available online through the University of Canterbury website.

I understand voice recorded data will be transcribed and stored on a password protected computer at the University of Canterbury. I am aware voice recorded data will be destroyed after the thesis has been marked and transcribed data five years after that.

I understand that I am able to receive a report on the findings of the study by contacting the researcher at the end of the project. I know I can contact Belinda Smith the researcher at Belinda.smith@cdhb.health.nz or the three supervisors; Jeff Foote 03-351 6019, Dr Martin Lee martin.lee@cdhb.health.nz or Philip Schluter Philip.schluter@canterbury.ac.nz for further information. If I have any complaints, I can contact the Chair of the University of Ethics Committee, Private Bag 4800, Christchurch or human-ethics@canterbury.ac.nz

By signing below, I agree to participate in this research and will return the consent form at the beginning of the focus group.

Name:

Signature: *Date:*

Please put a tick in the box below if you would like a copy of your transcript. After receiving your transcript you have one week to contact me with any changes. ☐

Appendix six: *University of Canterbury Human Ethics Committee approval*

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

HUMAN ETHICS COMMITTEE

Secretary, Lynda Griffioen
Email: human-ethics@canterbury.ac.nz

Ref: HEC 2015/29/LR

27 May 2015

Belinda Smith
School of Health Sciences
UNIVERSITY OF CANTERBURY

Dear Belinda

Thank you for forwarding your Human Ethics Committee Low Risk application for your research proposal "Child oral health-improving dental attendance for 2-4 year olds in Canterbury and South Canterbury".

I am pleased to advise that this application has been reviewed and I confirm support of the Department's approval for this project.

With best wishes for your project.

Yours sincerely

Lindsey MacDonald
Chair, Human Ethics Committee

Appendix seven: *Canterbury District Health Boards ethics application form and approval*

Canterbury District Health Board
Te Poari Hauora o Waitaha

Research Office Project ID
15081

Audit Project

Request For Locality Authorisation Form Within

9		
10		

Research Office Project ID	15081

3.3 CDHB Facilities *(list specific location/s and department/s where the project will be conducted e.g., Burwood, Orthopaedic Dept.)*

1	NA
2	
3	

3.4 Other Resources Required *(e.g., Medical/Clinical Records, use of specific medical devices, etc.)*

NA

4. Documents Required – THE FOLLOWING DOCUMENT SHOULD BE SENT ALONG WITH THE COMPLETED AUDIT LOCALITY AUTHORISATION FORM:

4.1 Ethics Approval* or Out-of Scope Letter *(enter name of Ethics Committee, reference number and date of letter).*
If Ethics Out-of-Scope letter is not available, Researcher should state the project is "outside ethics review" and sign and date

University of Canterbury Human Ethics Committee.
Ref: HEC 2015/29/LR
Date: 27 May 2015

**** If the project has been approved by HDEC, please ensure to request locality on-line via the HDEC website. You will need to type in our email address cdhb.researchoffice@otago.ac.nz. Please contact RO if you need assistance in requesting Locality.***

RESEARCHER TO ORGANISE APPROVAL FROM RESPECTIVE MANAGERS

5. Approval From All Areas Where Resources are Accessed

	Department 1	Department 2	Department 3
Belinda Smith Local Principal Investigator	Older Persons Health		
Signature			
Dr Martin Lee Clinical Director	Older Persons Health		
Signature			
Megan Gibbs Service Manager	Older Persons Health		
Signature			

Research Office I Canterbury District Health Board & University of Otago, Christchurch I PO Box 4345, Christchurch Mail Centre, Christchurch 8140, New Zealand Tel +64 3 364 0237 ● Email cdhb.researchoffice@otago.ac.nz www.otago.ac.nz/christchurch/research

6		
7		
8		

Research Office I Canterbury District Health Board & University of Otago, Christchurch I PO Box 4345, Christchurch Mail Centre, Christchurch 8140, New Zealand Tel +64 3 364 0237 ● Email cdhb.researchoffice@otago.ac.nz www.otago.ac.nz/christchurch/research

Other Approving Manager Name			
Title			
Signature			

Research Office Project ID	15081

RESEARCH OFFICE TO FACILITATE APPROVAL FROM CDHB GENERAL MANAGER/S

General Manager sign-off
This audit will take place in your hospital, do you approve it?

Hospital 1	Pauline Clark General Manager Christchurch Hospital *Name:*	*Signature:*	21/9/15 *Date:*
Hospital 2	*Name:*	*Signature:*	*Date:*
Hospital 3	*Name:*	*Signature:*	*Date:*

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